

FactoryLink 6.5.0



Reference Guide



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Preface

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PURPOSE

The FactoryLink ECS *Reference Guide* is a collection of field-by-field descriptions of the configuration panels used to configure the network operations.

This guide is prepared to present the details of configuring the panels for the twenty-one FactoryLink tasks that programmers use in completing applications.

The following guidelines help focus our purpose and goals to meet customer requirements:

- Accuracy is paramount—This FactoryLink documentation must provide accurate and reliable information and procedures.
- Time is valuable—This FactoryLink documentation must guide the programmer through what he needs to know quickly and efficiently.

AUDIENCE

The major audience of this manual is programmers who design and construct FactoryLink applications .

- develop communications interfaces to computers or devices for which standard interface tasks are not already developed.

In addition, FactoryLink Customer Support Services personnel use the procedures and examples included here to help you develop and troubleshoot your applications.

STRUCTURE OF THE *REFERENCE GUIDE*

The *Reference Guide* is part of the Core set of manuals in the overall FactoryLink Documentation Set. Refer to the Preface in *Fundamentals* for the structure of the entire Documentation Set.

This manual is divided into twenty-one chapters:

- Batch Recipe
- Database Browser
- Database Logging
- Data-Point Logging
- DDE Client
- Distributed Alarm Logger

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- *How To Use This Manual*
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- Event and Interval Timer
- File Manager
- FLLAN
- Historian
- Math & Logic
- Persistence
- PowerNet
- Power SPC
- Print Spooler
- Programmable Counters
- Report Generator
- Scaling & Deadbanding
- Schemas
- Trending
- Window Management

Each chapter begins with a brief introduction followed by the configuration information for the panels used in that task and ends with the messages associated with that task. The exception to this structure is Math & Logic, which presents only the messages for that task.

HOW TO USE THIS MANUAL

The material in this manual is presented alphabetically by task. It is intended to be utilized on a task-by-task as needed basis.

CONVENTIONS

The material in the Documentation Set adheres to the guidelines published in *The Digital Technical Documentation Handbook* by Schultz, Darrow, Kavanagh, and Morse; *Developing International User Information* by Jones, Kennelly, Mueller, Sweezy, Thomas, and Velez; and corporate style guidelines.

This manual uses the following conventions.

Convention	Description
<i>italic type</i>	Italic type is used to denote user-supplied variables in command examples. Italic type also sets off references to specific documents.
monospace type	Monospace type is used to denote command names and code examples or example output.
bold monospace type	Bold monospace type is used in command examples to indicate words that must be typed literally.
sans serif type	Sans Serif type is used to set off field names, button names, and keys on the keyboard.
blue type	Blue type is used for headings and to call attention to information within the text.
press nnnnn	Press is used to denote a key on the keyboard. The key name will appear in a sans serif type.
click on nnnnn	Click on is used to denote a button on the screen. The button name displays in a sans serif type.
Shift+F1	The + indicates the keys must be pressed simultaneously. Shift+F1 indicates you hold down the Shift key while you press another key or mouse button (indicated here by F1). Other key combinations are presented in the same manner.
F1 F2 F3	The space between the key callouts indicates press and release. The key sequence F1 F2 F3 indicates you press and release F1, then F2, and then F3. Other key combinations are presented in the same manner.

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- *Conventions*
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Convention	Description
File>Open	<p>The > indicates a progression through a menu sequence.</p> <p>File>Open indicates you choose Open from the File menu to perform the required action.</p> <p>Other menu sequences are presented in the same manner.</p>
FLAPP\user\drw\mydrw.g	<p>The \ indicates the directory structure for the listed file.</p> <p>FLAPP\user\drw\mydrw.g indicates the drawing file mydrw.g is located in the drw sub-directory of the user sub-directory to the FLAPP directory.</p> <p>Other directory structures are presented in the same manner.</p>
[]	Brackets indicate an optional argument. You can choose none, one, or all of the options.
{ } and	Braces indicate a choice. You must choose one of the elements. The vertical bar separates choices within braces.

Example Syntax

Example syntax using these conventions is provided below:

command *input_file* [*input_file...*] {*a/b*} *output_file*

where

- command* is typed as it is displayed in the syntax.
- input_file* indicates a variable the user supplies.
- [*input_file...*] indicates the user can optionally supply multiple input file names, each name separated by a space.
- {*a/b*} indicates either the *a* or *b* must be specified as an argument.
- output_file* indicates the user must specify an output file.

GETTING HELP

Contact your Sales or Customer Support Representative for help troubleshooting problems.

Also, help files are included for each configuration panel. These are accessed by clicking on Help on the panel menu bar.

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- *Getting Help*
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Batch Recipe

The FactoryLink Batch Recipe task transfers sets of predefined values, sometimes called recipes, between binary disk files and selected elements and between the real-time database and an external device.

Principles of Operation

A batch recipe is a collection of elements in the real-time database grouped together for some purpose. These elements can contain internally-generated or operator-entered values.

You can perform the following functions with Batch Recipe:

- Define up to 8,000 different recipe templates, each associated with a virtually unlimited number of files.
- Store batch recipes in disk files so the total number of different recipes stored on a system is limited only by available disk space.
- Store each batch recipe file under a standard file name.
- Specify up to 8,000 elements for one batch recipe template.
- Use with any of the five FactoryLink data types: digital, analog, long analog, floating-point, and message.

You can configure Batch Recipe for use in many diverse applications. For example, a program can use a graphic display for the entry of application values and write these values to an external device using the FactoryLink EDI task. Batch Recipe can save these element values in a recipe so the program can then read the values from the batch recipe file.

Sample applications that use a single batch recipe template include:

- Producing a particular line of paint. You can use multiple files using the same recipe template to set various hues or colors of the paint being produced.
- Setting up various external devices with different files for days of the week, end of the month, and other schedules.
- Setting up an environment for a testing procedure with various files to establish different sets of testing parameters.

- **BATCH RECIPE**
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You can use batch recipes in conjunction any FactoryLink task because each FactoryLink task communicates with other tasks through the real-time database.

Batch Recipe executes as a background task. The task does not require operator intervention at run time unless you design the application to require it.

You can configure Batch Recipe to be triggered by events, timers, or operator commands, such as:

- An external device read operation
- A Math & Logic calculation, either Interpreted or Compiled
- An activity from another station on a network
- Input from the operator using a keyboard or pointing device

Monitor the Run-Time Manager screen to determine the status of Batch Recipe at run time.

When performing a platform-dependent FLSAVE, FactoryLink saves recipe files; however, when performing a platform-independent or multiplatform FLSAVE, FactoryLink does not save recipe files.

Creating and Animating a Graphics Display

You can create and animate a graphic display using the Application Editor for an operator to use when selecting a recipe name and to set or modify values in a recipe.

RECIPE CONTROL PANEL

Perform the following steps to configure the Recipe Control panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Recipe in the Configuration Manager Main Menu to display the Recipe Control panel.

Recipe Name	Read Trigger	Save Trigger	File Spec.

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:

Recipe Name Alphanumeric string of 1 to 16 characters that specifies the unique name of the recipe template to be defined or modified. Use View>Search to display a recipe template that already exists.

Valid Entry: alphanumeric string of 1 to 16 characters

Read Trigger Name of an element that initiates a read operation. When Recipe detects this element has been forced to 1 (ON), the task reads the binary values from the disk file specified in the File Spec. and File Spec. Variable fields and transfers them to the elements specified in the Recipe Information panel.

Valid Entry: standard tag name

- **BATCH RECIPE**
- *Recipe Control Panel*
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Save Trigger Name of a digital element that initiates a write operation. When the value of this element changes to 1 (ON), Recipe collects the current values of the elements specified in the Recipe Information panel and writes them to the binary disk file specified in the File Spec. and File Spec.Variable fields.

Valid Entry: **standard tag name**

Valid Data Type: **digital**

File Spec. Variable specifier that uses the value of the File Spec. Variable element as the variable.

Sample Path—if you specify the Path File Name **DISK:/RECIPE/PAINT%03d.RCP**, and define the File Spec. Variable element as an analog data type, value 23, the system generates the following file name:

DISK:/recipe/paint023.rcp

Because the default path is **/FLAPP/FLNAME/FLDOMAIN/FLUSER/RCP**, the File Spec. of **PAINT/%s.RCP** and the File Spec. Variable containing a message data type value of red generate the following file name:

/FLAPP/FLNAME/FLDOMAIN/FLUSER/rcp/paint/red.rcp

If the File Spec. Variable is absent, the file name is generated from the File Spec. and/or the default path name (**/FLAPP/FLNAME/FLDOMAIN/FLUSER/RCP**). If the File Spec. is absent, it defaults to **%s,%d,%1d**, or **%-8.3f** as appropriate for the File Spec. Variable data type.

File Spec. Variable Name of an element whose value is used with the entry in the File Spec. field to form the file/path name for a binary disk file that contains a specific recipe.

Valid Entry: **standard tag name**

Max. Msg. Length Number between 1 and 255 that specifies the maximum number of characters in a message.

Valid Entry: **numeric value between 1 and 255**

Forced Write	<p>Indicates whether all change-status flags are to be set to 1 (ON) when a read operation occurs. Because of this option, in a read operation, Batch Recipe can set change-status flags for all elements specified in a recipe rather than only for those elements whose values have changed since the last read operation. Refer to <i>FactoryLink Fundamentals</i> for information about change-status flags. This can be one of the following:</p> <p>YES Sets change-status flags for all elements in a read operation.</p> <p>NO Causes change-status flags to be set only for elements whose values have changed since the last read operation. This is the default.</p>
Completion Trigger	<p>Name of an element whose value is forced to 1 (ON) by the Recipe task when a read or write operation is completed. The value of the Completion Trigger element is 0 (OFF) when the program begins loading a new batch recipe file from the specified drive to the real-time database and is 1 (ON) (becomes a 1 and has its change-status flag set to 1) when the file finishes loading. Completion Triggers are used in multiple operations. For example, the Completion Trigger can initiate a write of a recipe to an external device or it can initiate a message to the operator on a graphics screen stating an operation has been performed. The Math & Logic task can check the trigger to determine successful reading or writing of the recipe.</p> <p>Valid Entry: standard tag name</p>
Completion Status	<p>Name of an element set to 0 (OFF) when the last recipe read or write is completed without an error or set to 1 (ON) when the last recipe read or write is completed with an error.</p> <p>Valid Entry: standard tag name</p>

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **BATCH RECIPE**
- *Recipe Information Panel*
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RECIPE INFORMATION PANEL

Perform the following steps to configure the Recipe Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Recipe in the Configuration Manager Main Menu to display the Recipe Information panel.

Tag Name	Tag Type	Tag Description

Recipe Name:

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:
 - Tag Name Name of each element to be read or written.
Valid Entry: standard tag name
 - Tag Type Data type of the element specified in the Tag Name field above. The data type is displayed automatically after you select a data type from the Tag Definition dialog and click on Enter.
Valid Entry: data type
 - Tag Description Description of the element specified in the Tag Name field. The description is displayed automatically if you enter a description in the Tag Definition dialog and click on Enter.
Valid Entry: element description
- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

BATCH RECIPE MESSAGES

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The following status and error messages can occur during Batch Recipe run time. Causes and corrective actions are listed for each error message.

Can't create recipe file *recipe filename*

- Cause:** The file name or pathname may be invalid or the disk may be full.
- Action:** Specify the Path File Name correctly. If the Path File Name is correct, ensure the directory exists. Run CHKDSK, fsck, ANALYZE, or any disk diagnostic program to determine whether the disk is full. Delete unnecessary files if the disk is full or nearly full.

Can't find recipe *recipe filename*

- Cause:** The task cannot locate the specified recipe file.
- Action:** Either the recipe file does not exist or the name of the file was entered incorrectly.

Error reading CT header

- Cause:** Either the file /CT/RECIPE.CT is corrupt or the .CT script file (/FLINK/CTG/RECIPE.CTG) and the FactoryLink Run-Time version are not the same version.
- Action:** Delete the file /FLAPP/CT/RECIPE.CT. Restart the application to rebuild the file, or execute CTGEN RECIPE.CT -V3.

In Windows NT and Windows 95, choose Start>Run and type CTGEN -ac:\FLAPP RECIPE.CT -V3 at the command line. This sets the FLAPP and executes CTGEN.

In OS/2 and UNIX, set FLAPP before running CTGEN.

Error reading CT index

- Cause:** The file /CT/RECIPE.CT has been damaged.
- Action:** Delete the file /FLAPP/CT/RECIPE.CT. Restart the application to rebuild the file, or execute CTGEN RECIPE.CT -V3.

In Windows NT and Windows 95, choose Start>Run and type

- **BATCH RECIPE**
- *Batch Recipe Messages*
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CTGEN -ac:\FLAPP RECIPE.CT -V3 at the command line. This sets the FLAPP and executes CTGEN.

In OS/2 and UNIX, set FLAPP before running CTGEN.

Error reading CT record

Cause: Either the file /CT/RECIPE.CT is corrupt, or the .CT script file (/FLINK/CTG/RECIPE.CTG) and the FactoryLink Run-Time version are not the same version.

Action: Delete the file /FLAPP/CT/RECIPE.CT. Restart the application to rebuild the file, or execute CTGEN RECIPE.CT -V3.

In Windows NT and Windows 95, choose Start>Run and type
CTGEN -ac:\FLAPP RECIPE.CT -V3 at the command line. This sets the FLAPP and executes CTGEN.

In OS/2 and UNIX, set FLAPP before running CTGEN.

Error reading recipe *filename*

Cause: Either the file is corrupt or the disk is damaged.

Action: Inspect the file and

In Windows NT, Windows 95, and OS/2, run the disk diagnostic program CHKDSK to determine if the disk is corrupt. If it is, recreate the file from scratch or from the backup disk or tape.

In UNIX, run the disk diagnostic and repair program fsck to determine if the disk is corrupt. If it is, fsck can repair the disk as it prompts you for information.

If the corruption is not on the root drive, inform your system administrator of the corruption as fsck will not be able to repair it.

Error writing recipe *filename*

Cause: The specified device is either full or corrupt.

Action: Run CHKDSK, fsck, ANALYZE, or any disk diagnostic program to determine whether the disk is full. Delete unnecessary files if the disk is full or almost full.

Invalid CT header size

Cause: Either the file /CT/RECIPE.CT is corrupt or the .CT script file (/FLINK/CTG/RECIPE.CTG) and the FactoryLink Run-Time version are not the same version.

Action: Delete the file /FLAPP/CT/RECIPE.CT. Restart the application to rebuild the file, or execute CTGEN RECIPE.CT -V3.

In Windows NT and Windows 95, choose Start>Run and type CTGEN -ac:\FLAPP RECIPE.CT -V3 at the command line. This sets the FLAPP and executes CTGEN.

In OS/2 and UNIX, set FLAPP before running CTGEN.

Invalid CT record size

Cause: Either the file /CT/RECIPE.CT is corrupt, or the .CT script file (/FLINK/CTG/RECIPE.CTG) and the FactoryLink Run-Time Manager are not the same version.

Action: Delete the file /FLAPP/CT/RECIPE.CT. Restart the application to rebuild the file, or execute CTGEN RECIPE.CT -V3.

In Windows NT and Windows 95, choose Start>Run and type CTGEN -ac:\FLAPP RECIPE.CT -V3 at the command line. This sets the FLAPP and executes CTGEN.

In OS/2 and UNIX, set FLAPP before running CTGEN.

Invalid tag

Cause: The program detects an invalid element or the element does not exist in the real-time database. Either data in the real-time database is corrupt or the Run-Time Manager was started without having run CTGEN.

Action: Run CTGEN.

- **BATCH RECIPE**
- *Batch Recipe Messages*
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No recipes defined

Cause: No recipes are defined in the Recipe Information panel.

Action: Define at least one recipe in the Recipe Information panel.

No tables configured for this task

Cause: Either you did not configure the Recipe Table or the following files could be missing or damaged:

- RECIPE.CDB database
 - RECIPE.MDX database
 - /FLAPP/CT/RECIPE.CT
 - .CT script /FLINK/CTGEN/RECIPE.CTG
- FLNEW or CTGEN may not have run correctly.

Action: Delete the .CT file. Run CTGEN and try again.

No triggers configured for this task

Cause: No read or write triggers are defined in the Recipe Table.

Action: Define read and write triggers in the Recipe Table.

Not enough RAM to load CTs

Cause: The task does not have enough RAM allocated to load the configuration tables.

Action: Shut down any unnecessary tasks. Increase the system RAM size if this does not help.

Recipe doesn't match CT *filename*

Cause: The specified recipe file does not match the Recipe Configuration Table. The number of element names for each data type and the maximum string space may not match.

Action: Reenter the recipe file. If the file is correctly specified, inspect the recipe file in the configuration table.

Recipe is too big

Cause: The total elements in a recipe will not fit in a 10000-byte buffer.

Action: Create a smaller recipe, decrease the size of the message strings, or switch from longana to analog data type.

Task initialization failed

- Cause:** Either a key is not installed, the wrong key is installed, or you are not authorized to have the key.
- Action:** Ensure the proper key is installed if you are authorized to have the key.

- **BATCH RECIPE**
- *Batch Recipe Messages*
-
-

Database Browser

The FactoryLink Database Browser task works in conjunction with the FactoryLink Historian task to allow an application to access data in a relational database through a browse window. Browser offers the following features:

- Allows relational data in a relational database to be manipulated from within FactoryLink
- Allows an application to send and retrieve data to and from all external database tables, including those created outside of FactoryLink
- Allows you to define elements referenced by Browser in arrays as well as individually

PRINCIPLES OF OPERATION

Browser is a Historian-client task that communicates with Historian through mailbox elements to send and receive historical information stored in an external database.

Browser accesses data in a relational database by selecting the data specified in a configuration table and placing it in a temporary table called a result table. The element views and modifies the data in the result table through a browse window. A browse window is a sliding window that maps data between the relational database and the real-time database. The browse window views selected portions of the result table.

USE OF LOGICAL EXPRESSIONS

You use logical expressions to specify the data in a relational database to view or modify. For the purposes of Browser, a logical expression is a command containing a standard Structured Query Language (SQL) WHERE clause. To make a logical expression flexible at run time, use the name of an element whose value is a WHERE clause. If viewing all data from a column in a relational database table, you do not need to specify a logical expression.

You must know how to write a standard SQL statement to configure Browser. See any SQL guide, such as *Quick Reference Guide to SQL* and/or the user manual for the relational database in use for information about writing SQL statements.

- **DATABASE BROWSER**
- *Configuring Program Arguments*
-
-

To select data from a database table, a logical expression works in conjunction with the table's column name and logical operators to form an SQL WHERE clause. The WHERE clause specifies which rows in a database table to place in the result table.

Browser performs four operations:

- Select
- Update
- Insert
- Delete

CONFIGURING PROGRAM ARGUMENTS

Configure the following system configuration program arguments to affect Database Browser functionality:

- L or -l Enables logging of errors to the log file. By default, the Database Browser does not log errors.
- N or -n Notifies on the completion of a SELECT trigger that the query resulted in an End of Fetch condition if the rows returned from the query do not equal the rows defined in the View Size. By default, the Database Browser task does not report an End of Fetch condition for a SELECT until a move operation advances the current row past the last row of the query.
- S[4-160] or -s[4-160] Sets the maximum number of SQL statements that the Database Browser will have active at one time. The default is 160. For very large applications, this program switch may have to be adjusted if the database server is unable to allocate a resource to open a new SQL cursor.
- V1 or -v1 Writes the SQL statements generated by the Database Browser to the log file. The Database Browser must have logging enabled for this program switch to work. The default is to not write the SQL statements to the log file.
- W[5-300] or -w[5-300] Sets the maximum timeout in seconds for the Database Browser to wait for a response from the Historian task. The default is 30 seconds.

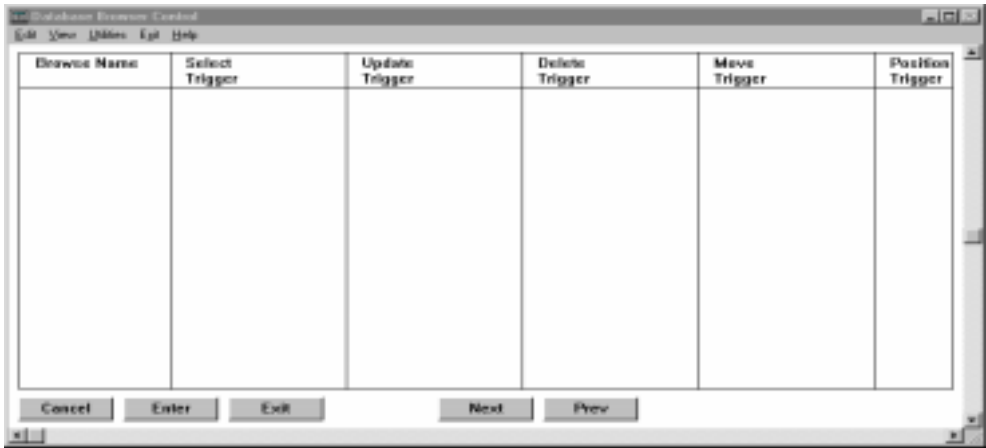
For values less than 30 seconds, this switch will only work correctly when the Historian initially achieved a successful connection with the database server. If the Historian failed to successfully connect with the database server, Database Browser will timeout in 30 seconds regardless of this switch setting.

- **DATABASE BROWSER**
- *Database Browser Control Panel*
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DATABASE BROWSER CONTROL PANEL

Perform the following steps to configure the Database Browser Control panel:

- 1 Ensure the domain selected is USER in the Configuration Manager Domain Selection box.
- 2 Choose Database Browser in the Configuration Manager Main Menu to display the Database Browser Control panel.



- 3 Specify the following information for this panel:

Browse Name

Alphanumeric string of 1 and 15 characters that specifies the developer-assigned name of the browse window being defined or modified.

Valid Entry: alphanumeric string of 1 and 15 characters

Select Trigger

Name of an element that triggers a select operation. A select operation selects specific data from a relational database table based upon information specified in the Database Browser Information panel and places it in a result table for you to view or manipulate.

ATag Definition dialog is displayed when you click on Enter. Select the appropriate data type if the tag specified in this field is undefined.

Valid Entry: standard tag name

Valid Data Type: digital, analog, longana, float, message

Update Trigger Name of an element that triggers an update operation. Browser performs a positional update if you defined a select trigger. When the value of this element changes during a positional update, Browser reads the values in the active row (the value of the current row tag) and updates the values in that row of the result table and external database.

In order for a positional update to work, the database table must have a unique constraint configured for it; that is, a unique index must exist for the database table. This can be configured in Database Schema Creation or executed externally to FactoryLink whenever the database table is created. Refer to Database Logging for more information on configuring the Database Schema Creation panel. Consult the RDBMS user's manual if you need to create a unique index on the database table that already exists.

Browser performs a logical update if you have not defined a select trigger to select specific data. During a logical update, Browser reads the values in the first row of the browse window and uses the logical expression defined in the Database Browser Information panel to update the values in the external database.

Valid Entry: standard tag name

Valid Data Type: digital, analog, longana, float, message

Delete Trigger Name of an element that triggers a delete operation. Browser performs a positional delete if you defined a select trigger. Browser deletes the active row in the browse window from the result table and external database when the value of this element changes during a positional delete.

In order for a positional delete to work, the database table must have a unique constraint configured for it; that is, a unique index must exist for the database table. This can be configured in Database Schema Creation or executed externally to FactoryLink whenever the database table is created. Refer to Database Logging for more information on configuring the Database Schema Creation panel. Consult the RDBMS user's manual if you need to create a unique index on the database table that already exists.

Browser performs a logical delete if you have not defined a select trigger. Browser deletes the rows in the relational database indicated by the logical expression during a logical delete.

Valid Entry: standard tag name

- **DATABASE BROWSER**
- *Database Browser Control Panel*
-
-

Valid Data Type: **digital, analog, longana, float, message**

Move Trigger (Requires use of the Select Trigger.) Name of an element that moves the active row up or down the indicated number of rows. The window scrolls the remaining number of records if the active row reaches the first or last record in the browse window. For example, if the value of the Move Trigger element is -3 and the active row is positioned on the first row displayed in the browse window, the data in the window scrolls down three rows.

Move operations can be performed only on result tables; therefore, move operations cannot be performed unless you have defined and executed a Select Trigger.

Valid Entry: **standard tag name**

Valid Data Type: **analog**

Position Trigger (Requires use of the Select Trigger.) Name of an element that moves the browse window to the specified row in the result table. The specified row is centered in the browse window and becomes the active row. For example, if the value of this element is 42, the browse table displays row 42 of the result table.

Position operations are performed only on result tables; therefore, position operations cannot be performed unless you define and execute a Select Trigger.

Valid Entry: **standard tag name**

Valid Data Type: **analog**

Historian Mailbox Name of a mailbox element whose value initiates communication with an external database. Browser sends requests for information from the relational database to this mailbox element. The Historian task reads this element and transfers the request to the external database.

Valid Entry: **standard tag name**

Valid Data Type: **mailbox**

Database Table Name Alphanumeric string of 1 and 63 characters that specifies the Database Alias Name (defined in the Historian task) and the name of the table in the relational database Browser requests information from. Place a “.” between the Database Alias Name and the Table Name.

Valid Entry: **alphanumeric string of 1 and 63 characters**

Current Row Tag	<p>Name of an element whose value indicates the position of the active row of data in a browse window. After Browser performs a Select, Move, or Position operation, Browser writes the value indicated by the position of the active row to this element.</p> <p>Browser performs all update and delete operations on the row indicated by the Current Row Tag element if you have defined a select trigger.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog</p>
Auto Create Record	<p>Indicates whether a new row is to be inserted in a database table if a row cannot be found when an update operation is being attempted. This feature works with logical updates but not with positional updates. This can be one of the following:</p> <p>YES Insert a new row of data.</p> <p>NO Do not insert any new rows. This is the default.</p>
Browse Table Size (Rows)	<p>Number between 1 and 50 characters that specifies the number of rows in a browse window that can be viewed or modified. The browse window size must be the same size as the element array specified in the Tag Name field of the Database Browser Information panel. All element arrays specified in the Tag Name field must be the same size. The browse window size must be the same as the size of the smallest element array if all element arrays are not the same size. The Browse Table Size (Rows) field also specifies the number of rows of data sent to Browser each time Browser requests data from an Historian.</p> <p>For example, the number specified in this field is 1. Enter a large positive value in the Move Trigger or Position Trigger field to scroll directly to the end of the result table. Because only one row of data is being requested at a time, the operation on a large result table takes more time than if the value in this field is larger.</p> <p>Valid Entry: number between 1 and 50 characters</p>
Internal Buffer Size (Rows)	<p>Number between 0 and 9999 that specifies the number of rows of data in a result table that can be stored in memory.</p> <p>Use the following guidelines to choose appropriate internal and external buffer sizes.</p> <p>Do not use a larger internal buffer than is needed because memory is limited.</p>

- **DATABASE BROWSER**
- *Database Browser Control Panel*
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Calculate the length of each row in the result table as well as the number of rows in the internal buffer to determine the amount of memory required.

Browser operates more quickly if all rows in a result table are stored in the internal buffer as opposed to being stored in the external buffer.

Use a value large enough to contain as many rows as necessary but small enough not to use up too much memory. If the size of the result table is unknown and if memory allows, we recommend you enter 100; however, if the result table will be shorter, enter a number equalling (n)-(element array size) where n is the number of rows in the result table.

The overflow is stored in the external buffer if you choose to store only a given number of rows in the internal buffer and the result table grows larger than the internal buffer.

If: the internal buffer can store 25 rows
 and
 the external buffer can store an unlimited
 number of rows
 and
 the browse window has 5 rows
 and
 then: the result table contains 50 rows,
 5 rows display in the browse window
 and
 25 rows are stored in the internal buffer
 and
 50 rows are stored in the external buffer

Valid Entry: numeric value of up to 9999

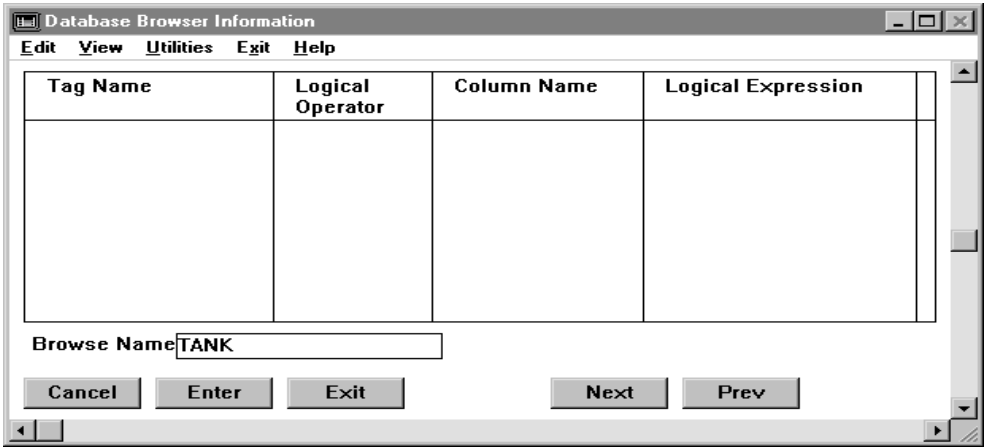
- | | |
|-----------------------------|---|
| External Buffer Size (Rows) | This field is not currently in use. |
| Completion Trigger | <p>Name of an element whose change-status flag is set whenever any browse operation for this browse window is complete.</p> <p style="padding-left: 40px;">Valid Entry: standard tag name</p> <p style="padding-left: 40px;">Valid Data Type: digital, analog, longana, float, message</p> |
| Completion Status | <p>Name of an element whose value indicates the status of the current operation completed by the Browser or Historian. The status is displayed as a character string if this element is of message data type; otherwise, it displays as a numeric code. Refer to “Database Browser Status Codes and Status Messages” on page 45 for the codes and messages that can display in this tag.</p> <p>You can configure this element to work in conjunction with output objects in the Application Editor task to display codes or messages on any graphics screen. Refer to the <i>FactoryLink ECS Application Editor</i> for information about defining output objects.</p> <p>You can also configure Math & Logic to monitor this element and respond to or ignore errors that occur.</p> <p style="padding-left: 40px;">Valid Entry: standard tag name</p> <p style="padding-left: 40px;">Valid Data Type: digital, analog, longana, float, message</p> |
- 4 Click on Enter to save the information.
 - 5 Click on Exit to return to the Main Menu.

- **DATABASE BROWSER**
- *Database Browser Information Panel*
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DATABASE BROWSER INFORMATION PANEL

Perform the following steps to configure the Database Browser Information panel:

- 1 Ensure the domain selected is USER in the Configuration Manager Domain Selection box.
- 2 Choose Database Browser in the Configuration Manager Main Menu to display the Database Browser Information panel.



- 3 Specify the following information for this panel:

Tag Name Name of an element that contains the values from a column of a relational database table. If the Browse Table Size field in the Database Browser Control panel is greater than 1, the element must be an array of Browse Table Size or greater. Ensure all elements entered in the Tag Name field can accommodate Browse Table Size.

If the tag specified in this field is undefined, select the appropriate data type.

Valid Entry: standard tag name

Valid Data Type: digital, analog, longana, float, message

Logical Operator Part of a WHERE clause that specifies the conditions Browser uses to select rows from a relational database table. This field works in conjunction with the Column Name and Logical Expression fields (described below) to specify WHERE clauses. This can be one of the following:

AND Specifies a combination of conditions in a logical expression.

OR Specifies a list of alternate conditions in a logical expression.

FactoryLink performs a sequential search through the database even if the columns are indexed if you use the OR operator in a logical expression when using the Historian for dBASE IV. This may result in a slower response time if the database is large; therefore, we recommend you not use OR operators in logical expressions so the Historian for dBASE IV can take advantage of indices.

NOT Negates a condition in a logical expression.

AND_NOT Specifies a combination of conditions and negated conditions in a logical expression.

OR_NOT Specifies a list of alternate negated conditions in a logical expression. (See examples in the following table.)

WHERE clause	Description
Col2 = 3 AND Col4 > 4	In this example, Database Browser selects all rows where Col2 is equal to 3 AND Col4 is greater than 4.
Col3 < 6 OR Col2 >= 19	In this example, Database Browser selects all rows where Col3 is less than 6 OR Col2 is greater than or equal to 19.
Col4 > 7 AND_NOT Col4 = 20	In this example, Database Browser selects all rows where Col4 is greater than 7 AND_NOT equal to 20.

Column Name Alphanumeric string of 1 and 63 characters that specifies:

- **DATABASE BROWSER**
- *Database Browser Information Panel*
-
-

(1) Character string representing the relational database column name associated with the Tag Name element. The Column Name field works in conjunction with the Logical Operator and Logical Expression fields to specify WHERE clauses with the following format:

`([table.]column)`

where

- table** Is the relational database table name. Include table, if the table name is different from the table name specified in the Database.Table Name field in the Database Browser Control panel.
- column** Is the name of the column within the relational database table. Use the same column name in two rows of a panel.

OR

(2) SQL function, such as MAX (col_name) or COUNT (*). The result of this function is written to the element specified in the Tag Name field. SQL functions are supported only in SELECT statements. SQL functions are not supported in UPDATE statements or by the Historian for dBASE IV.

Valid Entry: alphanumeric string of 1 and 63 characters

Logical Expression Conditional statement that restricts the rows selected, updated, or deleted from a database table. This field works in conjunction with the Column Name and Logical Operator fields to generate the WHERE clause used by the SQL statement.

Note: An embedded variable in Database Browser is a FactoryLink element that is preceded by a colon. The embedded variable can only be used in the Logical Expression field. The embedded variable can be any FactoryLink element type except mailbox. If the element is an array specify the dimension (for example, :tag_xyz[2]). The element in the embedded variable is not detected by Configuration Manager as a tag, therefore user must define the tag somewhere else in the application such as in Math & Logic.

The conditional statement in a Logical Expression field can consist of relational operators. The following is a list of relational operators that are supported by the dBASE IV Historian.

=	is equal to
<	is less than
>	is greater than
<>	is not equal to
<=	is less than or equal to
>=	is greater than or equal to
is not null	is not a null value (for dBASE IV Historian TRUE when database column is not all spaces)
between X and Y	defines a range of values where X is the lower limit and Y is the higher limit. This is equal to COLNAME >= X and COLNAME <= Y

If using the dBASE IV Historian limit the logical expressions to this list of relational operators. If not using dBASE IV Historian, consult the RDBMS SQL Language user's manual for more information.

The WHERE clause is generated by appending the Local Operator, Column Name, and Logical Expression fields in the order displayed in the Database Browser Information panel. Punctuation is supplied by the Database Browser to ensure correct SQL syntax. Any embedded variable found in the Logical Expression field is replaced by a ?, which SQL defines as a substitution marker for a value to be supplied at execute time. The value supplied is the tag's value defined by the embedded variable.

The string generated by this is a WHERE condition. If the first word(s) in this string is not an SQL reserved word such as ORDER BY, then the reserved word WHERE is attached to the start of this string. The user must ensure that any placement of

- **DATABASE BROWSER**
- *Database Browser Information Panel*
-
-

SQL clauses such as ORDER BY and GROUP BY is properly ordered as defined by the SQL language for the targeted database server.

The ORDER BY clause is supported in the dBASE IV Historian but only to the extent that the columns listed in the ORDER BY clause must match an index that was created for the database table. The dBASE IV Historian does not build any temporary tables to reorder the rows so make sure the ORDER BY matches an index for the dBASE IV database table. If an ORDER BY clause does not match an index, the dBASE IV Historian returns an error.

If you define a Select Trigger in the Database Browser Control panel, the WHERE clause is used for the selected statement. If a Select Trigger is not defined, the WHERE clause is used for the either the update operation or delete operation or both.

A Logical Expression can contain one of the following:

1. Character string of up to 79 characters containing an SQL expression or an SQL clause.

For example, an SQL expression:

OUTLETVAL = 30 and TANKID = 'BLUE001'

For example, an SQL clause:

ORDER BY TANKID

2. Character string of up to 79 characters representing an SQL expression that contains embedded variables. If the element is a message tag, the character data in the message tag should not be enclosed in single quotes.

For example:

=:tagTANKID

WHEREtagTANKID is a message tag of
value: *BLUE001*

3. An embedded message variable only. This variable must be a message element. The message element contains an SQL clause or SQL expression. The SQL expression cannot contain an embedded variable and any string constants in the SQL expression must be quoted in single quotes.

For example:

:tagSQLExpression

WHEREtagSQLExpression is a message tag

*OUTLETVAL = 30 and
TANKID = 'BLUE001'*

Note: Options 1 and 3 are different. The result is the same for both options but option 3 allows the user to change the tagSQLExpression element to a different expression before setting a select, update, or delete trigger there by altering the rows selected, updated, or deleted. Option 1 is always static and cannot be changed at run time. Option 2 allows the user to change the value of tagTANKID but the SQL expression is still the same just the search criteria for the where clause has changed.

The Database Browser substitutes embedded variables with the value of the tag defined in the embedded variable when executing the select, update, or delete SQL statement.

For example:

=:tagTANKID

generates the following WHERE clause:

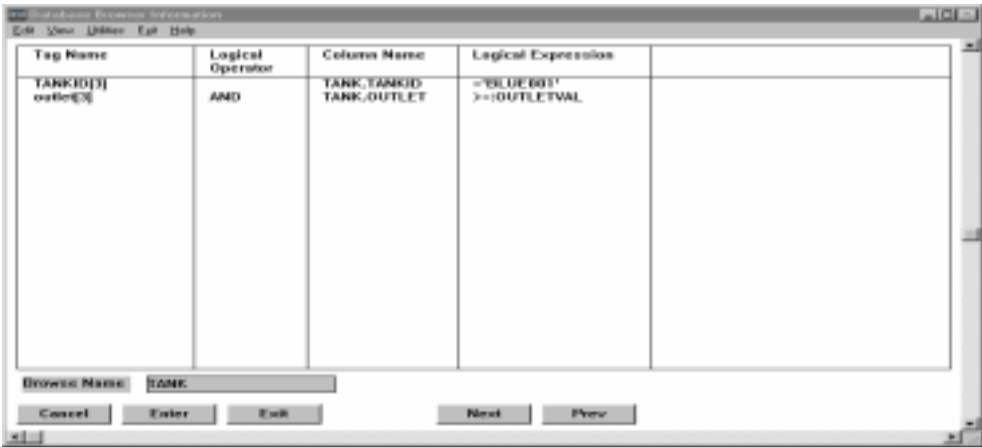
WHERE TANKID = ?

TANKID is the value of the Column Name field.

The Database Browser reads the value of the element tagTANKID from the real-time database and substitutes its value for the ? whenever it executes a select, update, or delete SQL statement.

- **DATABASE BROWSER**
- *Database Browser Information Panel*
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The panel resembles the following sample panel when complete.



Because the Select Trigger element SELTAG1 (defined in the Control panel) is digital in this example, the Historian returns the two following values to Browser when the change-status flag for SELTAG1 is set:

- Values where the column named TANKID equals BLUE001
- The column named OUTLET is greater than or equal to the value of the element OUTLETVAL.

Browser writes these values to the elements contained in the element arrays TANKID[3] and OUTLET[3]. These values are then displayed in a browse window.

Each Tag Name element displays one column of values in a browse window.

Because a Tag Name element array has been defined for TANKID and OUTLET, the values in the columns the logical expression is true for is displayed in the browse window.

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

DATABASE BROWSER STATUS CODES AND STATUS MESSAGES

Whenever an error occurs at run time in the Browser, the Historian, or another Historian-client task, FactoryLink sends a status code or status message for display to the Run-Time Manager screen and to the completion status tag. FactoryLink also sends a longer, more descriptive message to the log file if you created a log file. This section describes the error messages that can be displayed on the Run-Time Manager screen for the Browser task.

The codes and messages are displayed on a graphics screen if you define an output text object to display them.

The following table lists status codes written to a numeric Completion Status tag defined in the Database Browser Control panel. The descriptive message is written to a message Completion Status tag and may also be written to the Task Message tag in the System Configuration panel. See “Historian Messages” on page 258 for status codes that are less than 100. The Historian generates these codes, and they are returned to Browser when an historian operation is executed.

Code	Error	Cause	Action
100	Asynchronous error from Historian function.	An SQL COMMIT operation failed within the Historian.	Consult the database administrator for the external database in use.
101	Error from Historian function.	A syntax error may have been made or information may not have been entered in a required field in a configuration table.	Correct the SQL statement syntax error by modifying the Information panel for the task receiving the error. If the information is correct, ensure the database table exists.
102	No fields for select.	The task is trying to execute a select operation, but no Tag Name elements have been defined to hold the data from the select operation.	Define some Tag Name elements in the Tag Name field in the Database Browser Information panel.

- **DATABASE BROWSER**
- *Database Browser Status Codes and Status Messages*
-
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Code	Error	Cause	Action
103	No fields for insert.	The task is trying to execute an insert operation, but no Tag Name elements have been defined to hold the data from the insert operation.	Define some Tag Name elements in the Tag Name field in the Database Browser Information panel.
104	No fields for update.	Task is trying to execute an update operation, but no Tag Name elements have been defined to hold the data from the update operation.	Define some Tag Name elements in the Tag Name field in the Database Browser Information panel.
105	Update and delete operations not supported with multi-table view.	Update and delete operations cannot be performed when using multi-table view.	Do not perform update and delete operations when using multi-table view.
106	Cannot update until select is performed.	A select trigger is defined but a select operation has not executed. Execute a select operation before an update operation.	Execute a select operation and then retry the update operation.
107	Cannot delete until select is performed.	A select trigger is defined but a select operation has not been executed. Execute a select operation before a delete operation.	Execute a select operation and then retry the delete operation.
108	Cannot move until select is performed.	A select trigger is defined but a select operation has not been executed. Execute a select operation before a move operation.	Execute a select operation and then retry the move operation.

Code	Error	Cause	Action
109	This row of data has been deleted.	A delete operation attempted on a nonexistent row	No action required.
110	A FactoryLink function returned an error.	FactoryLink PAK function encountered an unknown or unexpected error.	Contact Customer Support.
111	A file function error occurred.	System encountered an unknown error while trying to read or write to the external buffer.	If not enough space, decrease the buffer size. If there is enough disk space, contact Customer Support.
112	Bad tag in logical expression.	Either a typographical error exists or an undefined or invalid element name is entered as an embedded variable element in a Logical Expression field.	Correct typographical errors. If you did not make a typographical error, then define the element in a FactoryLink task other than Browser.
113	Invalid use of tag in logical expression.	Logical expression does not contain a valid element name.	Correct typographical errors and ensure the element name is the name of a valid element.
114	HSDA structure too small.	Invalid use of an element in logical expression.	Define the element used in the logical expression in a FactoryLink task other than Browser.
115	Can't open log file.	Disk space too low.	If disk space is low, delete unneeded files or programs; otherwise, contact Customer Support.

- **DATABASE BROWSER**
- *Database Browser Status Codes and Status Messages*
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Code	Error	Cause	Action
116	A request for memory failed.	Internal error.	Contact Customer Support.
117	Can't find unique index for table.	A positional update or delete operation occurred on a table without a unique index.	Create a unique index for the table and retry the operation.

One of the following messages is displayed to the right of BROWSER on the Run-Time Manager screen if an error occurs with Browser or Historian at run time. The first three letters in the message are a variable that indicates whether the message came from Browser (DBB) or the Historian (HIS). This variable three-letter prefix displays in the messages below as *nnn*. Open the .LOG file to display the complete message if truncated on the Run-Time Manager screen.

nnn*-[BAD_SMBX] Bad send mailbox. Browse rec: *browse window name

Cause: You entered the wrong mailbox element name.

Action: Look up the mailbox element name for the Historian being used in the Historian Mailbox field of the Historian Mailbox Information panel. Enter the correct name in the Historian Mailbox field of the Database Browser Control panel.

nnn*-[BAD_WHERE_TAG] Bad tag *element name* for logical expression. Browse rec: *browse window name

Cause: Either you made a typographical error or entered an undefined or invalid element name as the embedded message element in a logical expression.

Action: Correct all typographical errors. Define the element in a FactoryLink task other than Browser if you did not make a typographical error.

nnn*-[CT_HDR] No sel, upd, or delete trigger defined. Browse rec: *browse window name

Cause: None of the following triggers are defined:

- select
- delete
- update

Action: Define at least one of the triggers listed above.

nnn-[DBTBL_SYNTAX] The Database Table value is missing a “.”. Browse rec: *browse window name*

Cause: You left the “.” out of the entry in the Database.Table Name field in the Database Browser Control panel.

Action: Put a “.” between the database name and the table name in the entry in the Database.Table Name field.

nnn-[FILE_ERR] File function “*function*” returned error *error code*. Browse rec: *browse window name*

Cause: The system encountered an unknown error while trying to read from or write to the external buffer.

Action: Verify you have enough disk space. If not, decrease the buffer size. Contact Customer Support if there is enough disk space.

nnn-[FL_FUNC] Function “*function*” returned error *error code*. Browse rec: *browse window name*

Cause: The FactoryLink PAK function encountered an unknown or unexpected error.

Action: Contact Customer Support.

nnn-[FL_FUNC] Function “FL_WRITE” returned error 9. Browse rec: *browse window name*

Cause: The column type in the database FactoryLink is trying to read from does not match the column type defined in the Database Logging task Schema Creation table.

Action: Redefine the column type in the Column Type field of the Schema Creation table to be the same as the column type in the database.

nnn-[FLERROR] FactoryLink error *error number*

Cause: An unknown PAK function error occurred within the Historian.

Action: Contact Customer Support.

- **DATABASE BROWSER**
- *Database Browser Status Codes and Status Messages*
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nnn-[HSCONNECT] Failed to connect to historian

Cause: You may have specified the wrong mailbox element name.

Action: Specify the Historian Predefined mailbox element name in the Historian Mailbox field in the Database Browser Control panel.

nnn-[HSDA_TOO_SMALL] HSDA structure too small. Browse rec: *browse window name*

Cause: You specified an invalid element in a logical expression.

Action: Define the element used in the logical expression in a FactoryLink task other than Browser. The element will then be valid in the logical expression.

nnn-[HSEDBERROR] Historian database error: *error message*

Cause: This message is accompanied by various other messages that describe the cause of the error.

Action: Read the accompanying message displayed on the Run-Time Manager screen or in the .LOG file and attempt to correct the problem based on the instructions in the message.

nnn-[HSDUPLICATE] Tried to insert a duplicate row

Cause: You tried to insert a duplicate row into a result table.

Action: No action required.

nnn-[HSENDOFETCH] Last row fetched or row not found

Cause: The task could not find a row during an update operation because that row does not exist. Or, during a move or position operation, you specified a nonexistent row (for example, row 100 when the table has only 50 rows). You attempted to go past the end or above the beginning of the result table.

Action: No action required.

nnn-[HSFLDEXISTS] Tried to add an existing field

Cause: You tried to add an existing field.

Action: No action required.

nnn-[HSMAXOPENS] Too many open sessions

Cause: You tried to open data from more than ten unique databases.

Action: Reference fewer than ten unique databases in a configuration table.

nnn-[HSMEMORY] Memory error malloc failed

Cause: Not enough memory is allocated for the Historian.

Action: Allocate more memory for the Historian.

nnn-[HSNOFIELD] Tried to access a nonexistent field

Cause: You tried to open a nonexistent field.

Action: No action required.

nnn-[HSNOTABLE] Tried to access a nonexistent table

Cause: You tried to open a nonexistent table.

Action: No action required.

nnn-[HSPREPARE] Failed to prepare stmtid

Cause: A nonexistent table name or field name is specified or a syntax error is made in an SQL statement.

Action: Ensure all entries in the Database Browser table are correct, especially those for the SQL statement.

nnn-[HSSTMTID] Invalid stmtid returned from historian

Cause: The Historian shut down before Browser or another Historian-client task.

Action: Shut down Browser and all other Historian-client tasks running on the system. Then, shut down the Historian and restart it, followed by Browser and all other Historian-client tasks running on the system.

Cause: An error occurred within Browser.

Action: Contact Customer Support.

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nnn-[HSTBLEXISTS] Tried to create an existing table

Cause: You tried to create an existing table.

Action: No action required.

nnn-[HSUNKNOWN] Unknown function request sent to historian

Cause: An error occurred within Browser.

Action: Contact Customer Support.

nnn-[INVUSE_WHERE_TAG] Invalid use of tag in logical expression. Browse rec: browse window name

Cause: A logical expression contains an invalid element name.

Action: Correct all typographical errors and ensure the element name is the name of a valid element.

nnn-[MULTI-VIEW] Update and delete operations not supported with multi-table view. Browse rec: browse window name

Cause: You tried to perform an update or delete operation while using multi-table view.

Action: Do not try to perform update or delete operations.

nnn-[NO_FLDS_INS] No fields for insert. Browse rec: browse window name

Cause: The task is trying to perform an insert operation but no Tag Name elements are defined to hold the data from the insert operation.

Action: Define some elements in the Tag Name field of the Database Browser Information panel.

nnn-[NO_FLDS_SEL] No fields for select. Browse rec: browse table name

Cause: The task is trying to execute a select operation but no Tag Name elements are defined to hold the data from the select operation.

Action: Define some elements in the Tag Name field of the Database Browser Information panel.

nnn-[NO_FLDS_UPD] No fields for update. Browse rec: browse table name

Cause: The task is trying to execute an update operation, but no Tag Name elements have been defined to hold the data from the update operation.

Action: Define some elements in the Tag Name field of the Database Browser Information panel.

nnn-[NO_LOGICAL_EXPR] No logical expr. Browse rec: browse table name. Column name: column name

Cause: A logical operation was defined but the logical expression was not specified.

Action: Either delete the operation or create a logical expression.

nnn-[NO_MEMORY] Out of RAM

Cause: Not enough RAM is available to run this task.

Action: Allocate more RAM for the Browser task.

nnn-[NOTASSOC] Col name column name not associated with browse or where tag. Browse rec: browse window name

Cause: A non-existent or an invalid Tag Name element is specified. A column name is also specified but not a logical expression.

Action: Define an element in the Tag Name field of the Database Browser Information panel and/or specify a logical expression.

nnn-[NO_UNIQ_INDXX] Can't find unique index for table. Browse rec: browse window name

Cause: You attempted a positional update or delete operation on a table without a unique index.

Action: Create a unique index for the table and retry the operation.

nnn-[NULL_ROW] This row of data was deleted. Browse rec: browse window name

Cause: You attempted a delete operation on a deleted row.

Action: No action required.

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nnn-[NULL_TABLE] No data for this table. Browse rec: browse table name

Cause: You tried to perform an update, move, or delete operation on a result table that contains no rows of data for either of two reasons: the select operation resulted in no rows of data or you deleted all rows of data from the table.

Action: No action required.

nnn-[OPEN_LOG] Can't open .LOG file.

Cause: The computer may have run out of disk space.

Action: Delete any unnecessary files or programs. Contact Customer Support.

nnn-[SEL_B4_DEL] Can't delete until select is performed. Browse rec: browse window name

Cause: You defined a select trigger but a select operation was not executed. A select operation must be executed before a delete operation can be performed.

Action: Execute a select operation and then retry the delete operation.

nnn-[SEL_B4_MOVE] Can't move until select is performed. Browse rec: browse window name

Cause: A select trigger is defined but a select operation was not executed. A select operation must be executed before a move operation can be performed.

Action: Execute a select operation and then retry the move operation.

nnn-[SEL_B4_UPD] Can't update until select is performed. Browse rec: browse window name

Cause: A select trigger is defined but a select operation was not executed. A select operation must be executed before an update operation can be performed.

Action: Execute a select operation and then retry the update operation.

nnn-[SQL_ASYNC] Asynchronous failure to *name*. Error: *error message*.

- Cause:** An SQL COMMIT operation failed within the Historian. For Oracle, it can fail if you do not have enough disk space.
- Action:** Consult the database administrator for the external database in use.

***nnn-[SQL_SYNC] Historian function *function* failed. Error: *error message*
Browse rec: *browse window name****

- Cause:** A syntax error may have been made or there may not be any information in a required field in a configuration table.
- Action:** Modify the information in the Database Browser Information panel to create a correct SQL statement if the error is a syntax error. Ensure the database table exists if the panels are correct.

nnn-[UNSOL_MSG_RCVD] Unsolicited message received from *element number*

- Cause:** Another task wrote to Browser's mailbox element (Browser is not expecting to hear from this task).
- Action:** Determine which task is writing to Browser's mailbox element by looking at the X-reference list in the Configuration Manager Main Menu. Correct the problem by changing the mailbox element name of the task writing to Browser's mailbox element.

F_BAD_CT_SIZE Bad size for CT #(CT number)

- Cause:** There is a discrepancy between the Browser script file and the size. You may have modified the Browser .CTG file.
- Action:** Copy the .CTG file from the Installation disk over the modified one. Contact Customer Support if this is not the problem.

F_BAD_RMBX Invalid global mailbox: *mailbox name*

- Cause:** Browser's predefined mailbox element is nonexistent in the GLOBAL.CT file.
- Action:** Contact Customer Support.

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F_INIT Task initialization failed

Cause: This message is preceded by another error message that explains the cause of the error.

Action: Examine the preceding message to determine the cause of the initialization failure.

F_NO_CTS No valid tables in CT archive *file name*

Cause: The Database Browser table is been configured.

Action: Configure the Database Browser table.

F_NO-DOMAIN_NAME No domain name for appl. directory *directory*

Cause: No domain name is specified for the application directory.

Action: Specify a domain name for the application directory.

F_OPEN_CT Can't open CT archive *file name*

Cause: A .CT file may have been deleted.

Action: Use CTGEN to rebuild the .CT file.

F_READ_CT Can't read CT #*CT number* in CT archive *file name*

Cause: A .CT file is corrupt.

Action: Rebuild the corrupt .CT file.

Database Logging

Data is stored as a data element in a real-time database as FactoryLink collects and computes the data. Each time data is collected or computed, the new data overwrites the element value stored in the real-time database.

Data can be logged to an historical database using Database Logging if data, such as reports or information on trend charts, is to be preserved for historical purposes. Database Logging reads data from the memory-based real-time database and sends it to a disk-based relational database.

Logging sends data to a relational database via FactoryLink Historian. The Historian used for this transfer depends on the relational database receiving the data. This can be either the dBASE IV-compatible database that can be purchased with FactoryLink or a third-party relational database, such as Oracle7 or Sybase. Refer to “Historian Task Definition” in *Fundamentals* for details on which third party relational databases are compatible with FactoryLink.

Database Logging Methodology

This section describes and illustrates how memory-resident real-time data is logged to a disk-based relational database.

1. The real-time database receives and stores data from various sources, such as a remote device, user input, or computation results from a FactoryLink task. When data is collected and stored in this database, other tasks can access and manipulate it.
2. Database Logging reads the values of data elements stored in the real-time database and maps the data elements to columns in a disk-based relational database table.
3. Database Logging sends the data from the real-time database to an Historian mailbox in the form of an SQL `INSERT` statement. The request remains in the Historian mailbox until Historian processes the request.

Once Historian processes the request, it connects to the relational database and inserts the data in the relational database file. Once in this file, other applications can use the data.

- **DATABASE LOGGING**
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You must consider the following when selecting a logging method:

Grouping Data: FactoryLink permits you to log data with or without a group association. If you elect to log data without a group association (nongrouped), the table delineates the data in the table from data in other tables.

Ordering Data FactoryLink permits you to log grouped and nongrouped data with or without a sequence or order number. If you elect to associate a sequence number with rows of data, your table structure must include a column that contains the sequence number associated with the row of data (record). The sequence number can be an integer or a time-stamping.

Indexing Records are displayed in a relational database table in the order they are added. This is known as the natural or physical order. The field or fields selected for indexing are called the index key. When a table is indexed, an index file is created that contains the indexed order. The actual record order in the database file remains unchanged. Accessing indexed records is faster than accessing non-indexed records.

Deletion Methods The logging method you choose depends in part on how data gets deleted from the relational database. Your options include:

Record rollover

Subgroup rollover

Group data deletion

Database Logging Methods Available database logging methods include:

Nongrouped/Nonsequenced Method

Nongrouped/Sequenced Method

Grouped Method

Configuring Program Arguments You configure system configuration program arguments to affect Database Logging functions.

DATABASE LOGGING CONTROL PANEL

Perform the following steps to configure the Database Logging Control panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Database Logging in the Configuration Manager Main Menu to display the Database Logging Control panel.

Log Name	Log Trigger	Historian Mailbox	Database Alias Name	Database Table Name	Schema Name
TREND	logtrig	histmbx	TREND	TRENDtbl	TRENDsch

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:

Log Name Alphanumeric string of between 1 and 16 characters to reference the logging operation.

Valid Entry: alphanumeric string of between 1 and 16 characters

Log Trigger Name of the tag that triggers the logging operation. If you leave this field blank, you must activate the logging operation with the Log-On Change field in the Database Logging Information panel. You can specify both a trigger in this field and a log on change in the Log On Change field of the Database Logging Information panel for the same operation. The operation executes each time the trigger is set and each time the tag value changes.

The tag specified must be in the SHARED domain.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float, message

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Historian Mailbox Name of the mailbox tag used to transfer the data to the Historian. Define the connection for this mailbox in the Historian table.

Refer to Chapter 120, “Historian,” for details on the strategy for defining historian mailboxes.

Valid Entry: **standard tag name**

Valid Data Type: **mailbox**

Database Alias Name Database alias name that references the database where Historian sends the data. Define the same alias name in the Historian table when defining the mailbox connection.

Valid Entry: **database alias name**

Database Table Name Name of up to 31 characters to reference the table in the relational database that receives the data. If this table does not already exist in the relational database when data is logged to it, it is created using the schema defined in the Schema Name field.

Valid Entry: **name of up to 31 characters**

Schema Name Name assigned to the schema that defines the structure of the relational database table that receives the data. If the table specified in the Database Table Name field of this panel does not already exist in the relational database when data is logged to it, it is created using the schema defined in this field.

If you enter a name in this field, it must match a name defined in the Schema Name field on the Schema Control panel. If it does not match a defined schema name, it is as if you left this field blank.

If you leave this field blank and a table with the name defined in the Database Table Name field on this panel does not exist in the relational database, a table is not created and data is not logged.

Valid Entry: **schema name**

Priority Number between 0 and 9 that controls the order Logging handles the queueing of logging operations in. This is a relative priority to other logging operations. For example, if Logging receives two requests at the same time from two different operations, it processes the request with the highest priority (lowest number) first.

Valid Entry: **number between 0 and 9 (default = 0)**

Completion Status Tag	<p>Name of a tag that indicates the completion of this logging operation. A 1 is written to this tag once data is logged to the Historian mailbox. Do not specify a tag name if you do not want to track the completion of this logging operation.</p> <p>This field is typically used for coordinating activities between tasks. That is, you can use the completion of this logging operation to trigger another task or operation.</p> <p>The tag specified must be in the SHARED domain.</p> <p>Valid Entry: standard tag name (default = digital)</p> <p>Valid Data Type: digital, analog, longana, float</p>
Current Sequence Tag	<p>Name of the tag that stores the current sequence number for this logging operation. The next time a logging operation occurs, the value stored in this tag is incremented by 1, and the new value is assigned to the row of data.</p> <p>The tag specified must be in the SHARED domain.</p> <p>The Current Sequence Tag value is saved in a file when FactoryLink is not running and updated to this field when FactoryLink is restarted so interrupts do not cause problems with duplicate records in the relational database table.</p> <p>Valid Entry: standard tag name (default = longana)</p> <p>Valid Data Type: analog, longana, float</p>
Sequence Change Tag	<p>Name of the tag used to adjust the numbering sequence during run time when ordering data by integer. This field provides the ability to manually create gaps in the numbering sequence of ordered data.</p> <p>If you leave this field blank, you can never manually adjust the numbering sequence of ordered data.</p> <p>When a value is force written to the tag specified in this field, the value written is used to adjust the Current Sequence Tag value. For example, if the Current Sequence Tag value is 5 and you force write a value of 5 to this tag, the Current Sequence Tag changes to 10.</p> <p>The tag specified must be in the SHARED domain.</p> <p>If the tag type is digital, increment the Current Sequence Tag by 1 by force writing a 1 to the Sequence Change Tag.</p>

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- *Database Logging Control Panel*
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If the tag type is analog, long analog, or floating-point, you can force write any whole positive or negative number to the Sequence Change Tag. If you write a positive number, the value of the Current Sequence Tag increments by the specified number. If a negative number is written, the value of the Current Sequence Tag decrements by the specified number.

Be careful when adjusting the Current Sequence Tag by a negative number as this can cause two rows of data to have the same sequence number. If the sequence number is part of a unique index, duplicate record values are not permitted in the column. FactoryLink displays an error message and the data is not logged if an attempt is made to log a duplicate value.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float

Group Delete Tag Name of a tag that contains the name of the group to delete when the Group Delete Trigger tag executes. When group deletion is triggered, all data for the group is deleted. If the group contains subgroups, all subgroups and their data are deleted.

If you do not specify a tag in this field, you can never delete data by specifying a group name.

If you do not specify a tag in this field but do specify a Group Delete Trigger, when the trigger executes, all nongrouped data sequenced by integer and all subgroups without a groupname association are deleted for the table.

The tag specified must be in the SHARED domain.

If groupname is numeric, valid types are digital, analog, long analog, or floating-point.

If groupname is made up of characters, valid type is message.

Enter the name of the group to delete in the Value field of the Tag Definition dialog.

Valid Entry: standard tag name

Group Delete Trigger Name of the tag that triggers the deletion if you want to delete data by group based on an event. When this trigger is set, the data for the group specified in the Group Delete Tag field on this panel is deleted. If you leave this field blank, deletion of group data is never triggered.

The tag specified must be in the SHARED domain.

Leave the Group Delete Tag and Group Delete Trigger fields blank if you are subgrouping data without a group association. If you wish to delete subgroup data without a group association, use the subgroup rollover feature.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float

Current Subgroup Tag Name of the tag that stores the current subgroup number for this group.

The next time a new subgroup is created for this group, the value stored in this tag is adjusted by the amount defined in the Subgroup Change Tag field on this panel and assigned to the new subgroup.

If this field is left blank, subgroups are not supported for this group and no subgroups are created for this group.

The value of this tag is set to 0 at group delete and 1 at subgroup rollover.

The tag specified must be in the SHARED domain and either analog, long analog, or floating-point. The default is long analog.

The Current Subgroup Tag value is saved in a file when FactoryLink is not running and updated to this field when FactoryLink is restarted so interrupts do not cause problems with duplicate records in the relational database.

Valid Entry: standard tag name (default = longana)

Valid Data Type: analog, longana, float

Subgroup Change Tag Name of the tag that triggers a subgroup change. When the value of this tag changes, a new subgroup is created. The value to assign to the new subgroup is calculated by adjusting the value in the Current Subgroup Tag by the value in the Subgroup Change Tag. This field provides the ability to manually set or change the subgroup numbering sequence.

If this field is left blank, subgroups are not supported for this group and no subgroups are created for this group.

If this field is left blank, subgroups are not supported for this group and no subgroups are created for this group.

If you enter a tag name in this field, a tag must also be defined in the Current Subgroup Tag field.

The tag specified must be in the SHARED domain.

If the tag type is digital, the Current Subgroup Tag increments by 1 when 1 is force-written to this tag.

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If the tag type is analog, long analog, or floating-point, force-write any whole positive or negative number to this tag. If it contains a positive number, the value in the Current Subgroup Tag increments by the specified number. If it contains a negative number, the value of the Current Subgroup Tag decrements by the specified number.

Be careful when adjusting the Current Subgroup Tag by a negative number as this can cause two subgroups to have the same number. If the group ID is part of a unique index, duplicate record values are not permitted in the column. If an attempt is made to log a duplicate value, FactoryLink displays an error message and the data is not logged.

Leave this field blank to use the same subgroup number each time this trigger executes.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float

Maximum
Subgroups

Number to indicate the maximum number of subgroups allowed before subgroup rollover occurs. If you leave this field blank, but have specified a subgroup tag, Logger continues to increment the subgroup number indefinitely until the disk is full.

If this field is left blank, subgroups are not supported for this group and no subgroups are created for this group.

Define a tag in the Current Subgroup Tag field for subgroup rollover to occur.

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

DATABASE LOGGING INFORMATION PANEL

Perform the following steps to configure the Database Logging Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Database Logging in the Configuration Manager Main Menu to display the Database Logging Information panel.

Tag Name	Column Name	Max. Mag. Length	Log On Change	Column Usage
SECTIME	TRENDKEY	0	N	
TIME	FLTIME	10	N	
A_SEC	FLSEC	0	N	
ctr_value1	FLCOUNTER	0	N	

Log Name: TRENDO

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:

Tag Name Entry in this field depends on the column usage of the column that receives the logged data. The options are described in the following table.

Column Use	Tag Name Field Value
data	Tag name that references the real-time data element to log in the column represented by this entry.
group	Name of the tag that contains the name of the group associated with this operation.
time	Do not specify a time. SECTIME is always used.

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Column Use	Tag Name Field Value
sequence	<p>If you want to manually set the sequence number to use for the next logging operation, name of the tag that contains the absolute number you want to use. If you never want to manually set the sequence number, leave this field blank.</p> <p>If this tag value is any number except zero, that number is assigned as the sequence number for the next row of data logged. Then this tag value is reset to zero. If a record with that sequence number already exists and the sequence number is part of a unique index, data is not logged.</p> <p>If this tag value is zero, the next sequence number assigned to a row of data logged is the value in the Current Sequence Tag field after it is incremented by 1.</p> <p>This operation does not update the Current Sequence Tag field. The next sequence number assigned continues from the number in the Current Sequence Tag field.</p>

The tag specified must be in the SHARED domain. The valid type depends on the column usage. The options are described in the following table.

Column Usage	Valid Tag Types
data	Digital, analog, floating-point, message, or long analog.
sequence	Analog, floating-point or long analog.
time	The global tag SECTIME is already defined. You do not have to specify a type.

Column Usage	Valid Tag Types
group	<p>If groupname is numeric, use digital, long analog, analog, or floating-point.</p> <p>If groupname is made up of characters, use message.</p>

Column Name Name of the column to receive the data. Enter the name of the column to receive the data.

If the table structure is defined through the relational database software, the name must match one of the columns defined for the table.

If the table structure is defined through FactoryLink, the name must match one of the column names defined in the Column Name field on the Schema Information panel.

Max. Msg. Length If the data logged to this column is of type message, number between 1 and 999 to specify the maximum number of characters allowed in this column. If you leave this field blank when the tag type is message, the default is 80. The value specified in this field should always be equal to or less than the value specified in the Length or Precision field on the Schema Information panel.

For tags defined with a tag type other than message, leave this field blank to assume the default of 0 (zero), which indicates this field is not used.

Log On Change Specifies whether or not the logging operation is triggered if the value for the tag specified in the Tag Name field of this panel changes. This can be one of the following:

YES The log operation occurs when the tag value changes. If you leave the Log Trigger field blank on the Database Logging Control panel, indicate YES in this field for at least one tag on this panel to activate the logging operation.

NO The log operation does not occur when the tag value changes. Specify NO if you do not want a change in this tag value to cause a log operation to occur.

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Specify both a trigger in the Log Trigger field of the Database Logging Control panel and a log on change in this field for the same operation. The operation executes each time the trigger is set and each time the value specified changes.

Column Usage Kind of information sent to the column. This can be one of the following:

data Use for columns that do not receive a sequence number or group ID.

sequence Use for columns receiving a sequence number in the form of an integer.

time Use for columns receiving a sequence number in the form of a time-stamping. The time-stamping used is SECTIME.

group Use for columns receiving the group identification assigned to the row of data.

Data is assumed if you leave this field blank, even though the word data is not displayed in the field.

The value entered must match the value entered for this column in the Column Usage field on the Schema Information panel if the table structure is defined with FactoryLink.

4 Click on Enter to save the information.

5 Click on Exit to return to the Main Menu.

DATABASE LOGGING MESSAGES

An error message is displayed on the Run-Time Manager screen next to the name of the Logging task on the SHARED domain window if any problems are encountered by Database Logging during run time.

Following is a list of all messages that can occur during Database Logging run time with possible causes and corrective actions.

Bad activation trigger in Log name: *logname*

Cause: An invalid activation trigger exists in the DBLOG.CT file.

Action: Verify the data type of the tag that triggers the logging operation specified by *logname* is a valid type where *logname* is the name designated for the control entry. Logging operation triggers are specified in the Log Trigger field of the Database Logging Control panel. Only digital, analog, long analog and floating-point types are valid. If incorrect, delete the tag, recreate it with a valid data type, and then restart the application.

Bad Completion trigger in Log name: *logname*

Cause: An invalid completion trigger exists in the DBLOG.CT file.

Action: Verify the data type of the tag that identifies the completion of the logging operation specified by *logname* is a valid type where *logname* is the name designated for the control entry. Logging completion triggers are specified in the Completion Status Tag field of the Database Logging Control panel. Only digital, analog, long analog and floating-point types are valid. If incorrect, delete the tag, recreate it with a valid data type, and then restart the application.

Bad current sequence tag in Log name: *logname*

Cause: The Current Sequence tag has an invalid data type for the logging operation specified by *logname*.

Action: Verify the data type for the Current Sequence Tag on the Database Logging Control panel is digital, analog, long analog, or floating-point. If incorrect, delete the tag, recreate it with a valid data type, and then restart the application.

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Bad current subgroup tag in log name: *logname*

- Cause:** The Current Subgroup Tag has an invalid data type for the logging operation specified by *logname*.
- Action:** Verify the data type for the Current Subgroup Tag on the Database Logging Control panel is digital, analog, long analog, or floating-point. If incorrect, delete the tag, recreate it with a valid data type, and then restart the application.

Bad field type in schema name: *schemaname*, field name *fieldname*

- Cause:** The Column Type field on the Schema Information panel is blank and data is defined in the Column Usage field.
- Action:** Ensure the Column Type field and Column Usage fields of the Schema Information panel are compatible.

Bad group delete tag in log name: *logname*

- Cause:** The Group Delete Tag has an invalid data type for the logging operation specified by *logname*.
- Action:** Verify the data type for the Group Delete Tag on the Database Logging Control panel is digital, analog, long analog, floating-point, or message. If incorrect, delete the tag, recreate it with a valid data type, and then restart the application.

Bad group delete trigger in log name: *logname*

- Cause:** The Group Delete Trigger has an invalid data type for the logging operation specified by *logname*.
- Action:** Verify the data type for the Group Delete Trigger on the Database Logging Control panel is digital, analog, long analog, floating-point, or message. If incorrect, delete the tag, recreate it with a valid data type, and then restart the application.

Bad log records in log name: *logname*

- Cause:** A field name that requires an entry is blank for the logging operation specified by *logname*.
- Action:** Verify all field entries in the Database Logging Control and Database Logging Information panels have valid entries.

- Cause:** The Tag Name field has an invalid data type for the logging operation specified by *logname*.
- Action:** Verify the data type for the Tag Name field on the Database Logging Control panel is digital, analog, floating-point, or message. If incorrect, delete the tag, recreate it with a valid data type, and then restart the application.

Bad read tag in log name: *logname*, field name: *fieldname*

- Cause:** The tag type is invalid for *fieldname*.
- Action:** Verify the data type is valid for *fieldname*. If incorrect, delete the tag, recreate it with a valid data type, and then restart the application.

Bad sequence change tag in log name: *logname*

- Cause:** The Sequence Change Tag has an invalid data type for the logging operation specified by *logname*.
- Action:** Verify the data type for the Sequence Change Tag field on the Database Logging Control panel is digital, analog, long analog or floating-point. If incorrect, delete the tag, recreate it with a valid data type, and then restart the application.

Bad schema records in schema name: *schemaname*

- Cause:** Unable to read the .CT file for *schemaname*.
- Action:** Verify Schema Name is valid in the Schema Control panel and valid information is in the Schema Information panel. If it is valid, shut down the Database Logging task and rebuild the .CT files by forcing a ctgen of dblogger (ctgen -v2 dblogger).

Bad send mailbox in log name: *logname*

- Cause:** The mailbox tag type is invalid for *logname*.
- Action:** Verify the tag type for the Historian Mailbox field in the Database Logging Control panel is mailbox. If incorrect, delete the tag, recreate it with a valid data type, and then restart the application.

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Bad size for CT # recordnum

Cause: A discrepancy exists between the indicated .CT file and the Database Logging task.

Action: Rebuild the .CT file by forcing a ctgen of dblogger (ctgen -v2 dblogger).

Bad subgroup change tag in log name: *logname*

Cause: The Subgroup Change Tag is defined with an invalid data type for *logname*.

Action: Verify the data type for the Subgroup Change Tag field on the Database Logging Control panel is digital, analog, long analog, or floating-point. If incorrect, delete the tag, recreate it with a valid data type, and then restart the application.

Can't close database

Cause: The Logging task issued a `close database` command to the Historian task and the Historian task could not close the database. The Historian may have lost the connection.

Action: Verify the Historian is connected to the database. Check error messages within the Historian. Perform troubleshooting for the Historian task. Also for applicable databases, make certain the FLINK user is still logged into the database server.

Can't create index: indexname for log name: *logname* using schema name: *schemaname*

Cause: An SQL error occurred while creating an index for *logname*.

Action: Verify a schema with Schema Name exists in the Schema Control panel with a proper index defined in the Index Information panel. Create one if one does not exist. If this does not correct the problem, generate a log file by placing a `-v4 -l4` in the System Configuration panel for Logging, restart FactoryLink, and reproduce the error condition. Refer to the file FLAPP/FLNAME/FLDOMAIN/FLUSER/LOG/DLMMDDYY.LOG to find all previous errors logged for *logname* and take corrective action as described for each error in this chapter.

Can't create table: *tablename* for log name *logname* using schema name: *schemaname*

Cause: An SQL error occurred while creating *tablename*.

Action: Verify a schema with *schemaname* exists in the Schema Control panel with a proper index defined in the Index Information panel. Create one if one does not exist. If this does not correct the problem, generate a log file by placing a -v4 -l4 in the System Configuration panel for Logging, restart FactoryLink, and reproduce the error condition. Refer to the file FLAPP/FLNAME/FLDOMAIN/FLUSER/LOG/DLMMDDYY.LOG to find all previous errors logged for *logname* and take corrective action as described for each error in this chapter. Also ensure you are connected to a valid database defined in the Historian.

Can't log record for log name: *logname*

Cause: A table does not exist for *logname* and no schema is defined.

Action: Create a schema using the schema name defined in the Schema Name field of the Database Logging Control panel or define a schema name in the existing Schema Name field.

Cause: Logging could not prepare an SQL statement to send to the Historian.

Action: Review the prepared SQL statements in the Historian .LOG files. Refer to the "Configuration Guide" for instructions on creating .LOG files. Take corrective action as described for each error in this chapter.

Can't open CT archive *filename*

Cause: The .CT archive file does not exist or is corrupt.

Action: Rebuild the .CT files by forcing a ctgen of dblogger (ctgen -v2 dblogger).

Can't open database *database_aliasname*

Cause: Database Logging issued an open database command to the Historian and the Historian could not open the database. The Historian may have lost the connection.

Action: Verify the correct database alias name is defined in both the Database Logging Control and the Historian Information panels.

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For applicable Historian tasks verify FLINK is connected to the database with a valid logon ID and a password. Generate .LOG files for Logging and the associated Historian.

Can't open log file

- Cause:** Database Logging can not open or write to the .LOG file used to debug the task.
- Action:** Verify the FLAPP/FLNAME/FLDOMAIN/FLUSER/LOG directory exists. If not, create it. If the problem persists, remove the -l argument from the Logging task in the System Configuration table and contact Customer Support.
- Cause:** Database Logging may have run out of memory or disk space.
- Action:** Verify free memory and sufficient disk space exist on the system.

Can't read CT # recordnum in CT archive *filename*

- Cause:** The archive file is corrupt.
- Action:** Rebuild the .CT files by forcing a ctgen of dblogger (ctgen -v2 dblogger). Contact Customer Support if Database Logging still does not run.

FactoryLink error filename

- Cause:** An unknown PAK function error occurred within Historian.
- Action:** Contact Customer Support.

Failed to connect to historian

- Cause:** An invalid mailbox tag is specified.
- Action:** Verify the tag name in the Historian Mailbox field in the Database Logging Control panel is a valid name and the tag type is mailbox. If incorrect, delete the tag and recreate it as defined in the Historian Mailbox Information panel. Generate .LOG files for the Logging task and Historian by placing a -v4 -14 in the program arguments in the System Configuration panel.

Failed to prepare stmtid

- Cause:** A nonexistent table name or field name is specified or a syntax error is made in an SQL statement.
- Action:** Verify all entries in the Database Logging configuration table are correct. Rerun the application with a -v4 -l4 as program arguments for the Logging and Historian tasks in the System Configuration panel.

Historian database error: filename

- Cause:** This message is accompanied by various other messages that describe the cause of the error.
- Action:** Respond to the message displayed on the Run-Time Manager screen or use the .LOG file by rerunning the application with a -v4 -l4 as program arguments for the Logging and Historian tasks in the System Configuration panel. Refer to the appropriate error message in this chapter for corrective action.

Invalid command line (usage)

- Cause:** A program argument specified for the Logging task in the System Configuration panel is not valid.
- Action:** Verify the specified argument is valid.

Invalid dimension specification in schema name: *schemaname*

- Cause:** A size is defined for a column that does not match the size of the data being inserted into the column.
- Action:** Increase the value in the Length or Precision field on the Schema Control panel.

Invalid global mailbox: DBLOGHISTMBX

- Cause:** The global mailbox name may be invalid or nonexistent.
- Action:** Verify the mailbox name tag type is valid in the Historian Mailbox field of the Database Logging Control panel. If incorrect or nonexistent, create a new mailbox name and assign a valid tag type. Only mailbox is an acceptable tag type. Restart the application.

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Invalid group configuration. Group tag and current subgroup tag does not exist in log name *logname*

- Cause:** One of the following tags is missing in the Database Logging Information panel for *logname*: Tag Name, Column Usage, or Current Subgroup Tag.
- Action:** Verify each field is defined in the Database Logging Information panel.
- Cause:** A column is incorrectly defined with a data type of GROUP.
- Action:** Delete GROUP from the Column Usage field in the Database Logging Information panel.

Invalid group configuration. Maximum subgroups defined and current subgroup tag does not exist in log name *logname*

- Cause:** A maximum number of subgroups is defined, but a Current Subgroup Tag does not exist in the Database Logging Control panel for *logname*.
- Action:** Create a Current Subgroup Tag for *logname* or delete the value in the Maximum Subgroups field.

Invalid group configuration. Subgroup change tag exists and current subgroup tag does not exist in log name *logname*

- Cause:** A Current Subgroup Tag is not defined in the Database Logging Control panel, but a Subgroup Change Tag exists for *logname*.
- Action:** Create a Current Subgroup Tag for *logname* or delete the Subgroup Change Tag.

Invalid schema name: *schemaname* in log name: *logname*

- Cause:** An incorrect or nonexistent schema name is entered in the Schema Name field on the Database Logging Control panel.
- Action:** Verify the spelling of the schema name in the Schema Control panel or create a schema with the name specified. Restart the application.

Invalid stmtid returned from historian

Cause: The Historian shut down.

Action: Shut down the Database Logging task and all other Historian tasks running. Restart the Historian and Database Logging. If this does not resolve the problem, rerun the application with a -v4 -l4 as program arguments for the Logging and Historian tasks in the System Configuration panel.

Memory error malloc failed

Cause: Insufficient memory is allocated for the Logging task.

Action: Check system for free memory and contact Customer Support.

No activation trigger for log name: *logname*

Cause: A trigger to start the logging operation specified by *logname* is not defined in the Database Logging Control panel.

Action: Define a trigger in the Log Trigger field for *logname*. Restart the application.

No CTs in CT archive dblog.ct

Cause: Database Logging configuration tables are not set up.

Action: Open the Configuration Manager Main Menu, choose Database Logging, and define the Database Logging Control and Database Logging Information panels. Verify entries in the Main Menu are in the right domain.

No database name in log name: *logname*

Cause: A database alias name is not specified for *logname*.

Action: Verify the existence and accuracy of the database alias name in the Database Logging Control panel. Change or add as necessary.

No domain name for application directory *directory*

Cause: The domain name is missing or invalid in the application directory.

Action: Verify the existence and accuracy of the domain in the operating system. Change or add as necessary.

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No field name in log name: *logname*, CT # *recordnum*

Cause: The Column Name field in the Database Logging Information panel is left blank or misspelled.

Action: Open the Database Logging Information panel and verify the existence and accuracy of the column name. Change or add a column name as necessary.

No field name in schema name: *schemaname*, CT # *recordnum*

Cause: A column name is not specified in the Schema Information panel for *schemaname*.

Action: Open the Schema Information panel and verify the existence and accuracy of the column name. Change or add as necessary.

No jobs configured in CT archive *dblog.ct*

Cause: Database Logging configuration tables are not set up.

Action: Open the Configuration Manager Main Menu, choose Database Logging, and define the Database Logging Control and Database Logging Information panels. Verify the Main Menu tables for Logging are configured in the correct domain.

No mailboxes in CT archive *ctfile*

Cause: A mailbox tag does not exist in the specified archive.

Action: Verify a valid mailbox tag is specified in the Logging Control panel and the Historian panels.

No records in log name: *logname*

Cause: Data is not defined for *logname* in the Database Logging Information panel.

Action: Open the Database Logging Control panel and delete *logname*, or configure a Database Logging Information panel for *logname*.

Cause: The Tag Name field is left blank in the Database Logging Information panel.

Action: Open the Database Logging Information panel. If the Column Usage field is data, add a valid tag name in the Tag Name field.

No records in schema name: *schemaname*

- Cause:** Historian is attempting to create a new table and cannot locate a schema. Data from the Schema Information panel is not configured or not entered.
- Action:** Open the Schema Control panel and configure a Schema Information panel for *schemaname*.

No schema defined in CT # *recordnum*

- Cause:** Data from the Schema Information panel is not configured or not entered.
- Action:** Open the Configuration Manager Main Menu and choose Database Schema Creation. Define the Schema Control, Schema Information, and Index Information panels.

No schema name defined in log name: *logname*

- Cause:** The Schema Name field in the Database Logging Control panel is blank or incorrect.
- Action:** Verify the existence of the schema in the Database Schema Creation table. Create it if one does not exist.
- Action:** Verify the accuracy of the schema name. Change or add a valid schema as necessary.

No table name in log name: *logname*

- Cause:** The Table Name field in the Database Logging Control panel is blank or invalid.
- Action:** Verify the existence and accuracy of the table name. Change or add a table name in the Table Name field in the Database Logging Control panel as necessary.

Out of RAM

- Cause:** Database Logging can not acquire memory to run.
- Action:** Restart the task. Install more RAM if the task fails again.

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SQL: failed to *historian_function*: error code *SQL_errornum*, *SQL_errormsg*

Cause: An SQL error occurred during a logging operation. Historian returned a database-dependent error code.

Action: Refer to the user manual for the appropriate relational database software. Consult the error code descriptions and take appropriate action to correct the problem.

SQL: failed to *historian_function*: *SQL_errormsg*

Cause: An SQL error occurred during a logging operation. Historian returned a database-dependent error code.

Action: Refer to the user manual for the appropriate relational database software. Consult the error code descriptions and take appropriate action to correct the problem.

SQL: Log name failed to *historian_function*: *SQL_errormsg*

Cause: An SQL error occurred during a logging operation. Historian returned a database-dependent error code.

Action: Refer to the user manual for the appropriate relational database software. Consult the error code descriptions and take appropriate action to correct the problem.

Task initialization failed

Cause: The Logging task failed to register with the kernel.

Action: Verify FactoryLink is up and running by running `flshm -lum`. Also verify it is a purchased option. Contact Customer Support if Database Logging still does not run.

Tried to access a nonexistent field

Cause: A field in the database table is missing.

Action: Verify the existence of the field in the Database Logging Control panel. If it does exist, verify the names match up between the Schema Control and the Database Logging Control panels. Create it if it does not exist.

Cause: Permission to access the field is denied.

Action: Log in through the appropriate user or have the user grant permission to access the field.

Tried to access a nonexistent table

- Cause:** The database table does not exist.
- Action:** Verify the table name in the Database Logging Control panel. If it does exist, verify the names match up between the Schema Control and the Database Logging Control panels. Create it if it does not exist.
- Cause:** Permission to open the table is denied.
- Action:** Log in through the appropriate user or have the user grant permission to access the table.

Tried to insert a duplicate row

- Cause:** The user tried to add an existing key value to a unique index. The row can not be inserted causing the data to be lost.
- Action:** Decrease the logging time interval or determine why the associated tag with the index column is not changing.

Unknown function request sent to historian

- Cause:** An SQL error occurred during a logging operation. Historian returned a database-dependent error code.
- Action:** Refer to the user manual for the appropriate relational database software. Consult the error code descriptions and take appropriate action to correct the problem.

Unsolicited message received from *elementnum*

- Cause:** A FactoryLink task other than Historian wrote to the Logging mailbox.
- Action:** View the X-reference list in the Main Menu to determine which task is writing to the Logging mailbox. Change the mailbox tag name of the task writing to the Logging mailbox.

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Data-Point Logging

As data is collected or computed by FactoryLink, it is stored as a data element in a real-time database. Each time a new value for an existing real-time database element is collected or computed, the current value stored in the real-time database for that element is overwritten by the new data.

If you want to preserve data for historical purposes, such as including on a report or displaying on a trend chart, you can log data to a historical database using a logger task. FactoryLink has two different loggers: Data-Point and Database. Both tasks read data from the real-time database and send it to the disk-based relational database via a FactoryLink Historian.

The Historian used for this transfer depends on the relational database receiving the data. The database can be either the dBASE IV-compatible database that can be purchased with FactoryLink or a third-party relational database, such as Oracle. Refer to the Historian part of this guide for details on which third party relational databases are compatible with FactoryLink.

Data-Point Logging simplifies the task of logging data by providing pre-configured tables. Because the tables are pre-configured, Data-Point Logging can only be used to store shared, numeric value tags. For all other types of tags, Database Logging should be used. Only one tag is logged to the database at a time. Multiple tags can be recorded to the same database and sorted later, if necessary. If information about the state of multiple tags at a particular trigger point is desired, the Database Logging task should be used. If you are uncertain whether to use Data-Point or Database Logging for your task, refer to “Data Logging Overview” for an explanation and comparison of both logging tasks.

Data-Point Logging Function

Data-Point Logging reduces the task of configuring data to be logged. Data-Point Logging uses a structured database with the number of columns and the names of the columns predefined by the Data-Point Logging Schema task. Because the tables structures are pre-configured, the Data-Point Logging task can only be used to log shared, numeric value tags. The tags to be logged can be specified in the Configuration Manager by means of the Data-Point Logging Information panel or by means of the Application Editor Tag Definition Dialog. Refer to

- **DATA-POINT LOGGING**
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“Data-Point Logging Table Schema Configuration” in the *Configuration Guide* and the *FactoryLink ECS Application Editor* for details.

Logging Methods

With Data-Point Logging, you can specify when a tag (data point) is to be logged based on one or more of the following:

- A change in the tag (exception logging)
- A fixed-time interval
- A change in a trigger tag

If a tag is logged more than once during a given second, any values logged after the first occurrence within that second are ignored.

At task startup, all exception and fixed-time interval tags are logged in order to create a default beginning reference point. Triggered logging tags are not logged at startup because the trigger tag will not be initiated yet.

Logging Data

Data-Point Logging allows you to specify tags to be logged

- When you are configuring the system
- Dynamically during run time

At initialization Data-Point Logging determines which file is newer:

- The configuration table (CT) file, {FLAPP}\shared\ct\dplogger.ct
- The Data-Point Save file, {FLAPP}\log\dplogger.dyn
- The Data-Point Save file specified in the Dynamic Logging Control panel Command File Tag field.

The newer file becomes the list of all tags currently configured for logging. The default Data-Point Save file is used if the Command File Tag is not configured or if the tag contains an empty string.

DATA-POINT LOGGING INFORMATION PANEL

Perform the following steps to configure the Data-Point Logging Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Data-Point Logging in the Configuration Manager Main Menu to display the Data-Point Logging Information panel.

Log Tag	Log On Change	Log Rate	Log Rate Based On	Log Trigger
testtag	Y			

Table Name: TRENDATA

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:

Log Tag Name of the real-time data element to be logged.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float

Log On Change Indicates whether data-point logging is triggered when the value of the tag specified in the Log Tag field changes. Press CTRL+K for a list of valid entries.

Valid Entry: yes, y, no, n

Log Rate Indicates an integer value to indicate the interval of time between logging occurrences of the tag being logged. This entry works in conjunction with the time unit defined by the Log Rate Based On field entry.

Valid Entry: integer from 1 to 86400

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- *Data-Point Logging Information Panel*

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Log Rate Based On Indicates the unit of time the Log Rate field entry is based on.
Press CTRL+K for a list of valid entries.

Valid Entry: seconds, minutes, hours, days (default = seconds)

Log Trigger Indicates the name of the tag that triggers the data-point logging operation. The log tag is logged when this log trigger is either digital and is equal to 1 or non-digital and its value changes.

Any trigger tags you define in Data-Point Logging must be triggered by some other FactoryLink task, such as Timer.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float, message

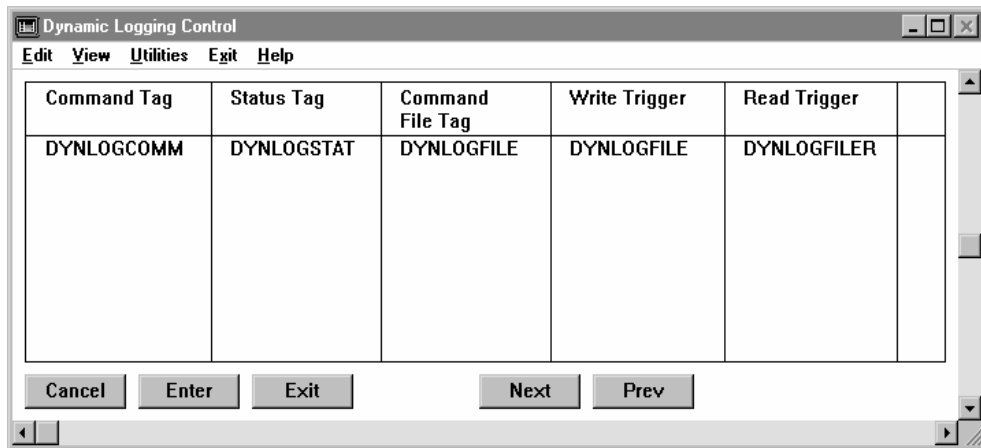
4 Click on Enter to save the information.

5 Click on Exit to return to the Main Menu.

DYNAMIC LOGGING CONTROL PANEL

Perform the following steps to configure the Dynamic Logging Control panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Data-Point Logging in the Configuration Manager Main Menu to display the Dynamic Logging Control panel.



- 3 Specify the following information in this panel:

Command Tag Either one LOG command or one REMOVE command.

Valid Entry: standard tag name

Valid Data Type: message

Status Tag Name of a tag that receives the status of the dynamic command request for the corresponding Command Tag entry.

Valid Entry: standard tag name (default = analog)

Valid Data Type: analog, message

Command File Tag Name of the data-point save file generated or loaded when the associated Write Trigger or Read Trigger is set.

If you do not provide this optional entry, the default data-point save file is used: {FLAPP}\log\dplogger.dyn.

If the file name does not include an absolute path, it is considered to be relative to the FLAPP directory.

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Valid Entry: **standard tag name**

Valid Data Type: **message**

Write Trigger Name of the tag that triggers the generation of the data-point save file named in the Command File Tag field.

The data-point save file is generated when this trigger tag is either digital and is equal to 1 or non-digital and its value changes.

Valid Entry: **standard tag name (default = digital)**

Valid Data Type: **digital, analog, longana, float, message**

Read Trigger Name of the tag that triggers the loading of the data-point save file named in the Command File Tag field.

The data-point save file is loaded when this trigger tag is either digital and is equal to 1 or non-digital and its value changes.

When this trigger is set, the data-point save file specified in the Command File Tag field is loaded.

Valid Entry: **standard tag name (default = digital)**

Valid Data Type: **digital, analog, longana, float, message**

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

LOGGING MESSAGES AND CODES

During normal operations and upon detecting an error condition, FactoryLink generates and displays messages for the Data-Point Logging task. These messages are briefly displayed on the Run-Time Manager screen. For FactoryLink to store system messages, you define database tags the messages are written to when they occur. To view the stored messages, you configure these tags as graphic objects using the Application Editor. Refer to the *FactoryLink ECS Application Editor* for details.

This section explains the types of detectable errors and lists and describes the messages Data-Point Logging can generate and display during development, startup, and run time.

Error Detection

FactoryLink detects errors and generates and displays three categories of messages during development, startup, and run time of Data-Point Logging. This section describes each type of message.

- **Development-time messages**—Error detection during development is controlled by the Attribute Catalog (AC) file used by Configuration Manager and Application Editor. Refer to the *FactoryLink ECS Application Editor* for more information.
- **Startup messages**—During Data-Point Logging startup, messages generated by Data-Point Logging are displayed on the system monitor as the conditions prompting each message occur.
- **Run-time messages**—System messages generated by the Data-Point Logging task at run time are displayed on the Run-Time Manager screen. These messages are displayed opposite the SharedTask description for Data-Point Logging in the Last Message field.

Error Detection at Task Start Up

Data-Point Logging checks entries in two of its panels at Configuration Table load time:

- **Data-Point Logging Control panel**—Data-Point Logging verifies each Data-Point Logging control record has a corresponding Historian Mailbox entry and Database Alias Name entry configured in Historian.

A fatal error code is displayed on the Run-Time Manager screen if any control record fails this test, and Data-Point Logging pauses for one second and then terminates.

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- Dynamic Logging Control panel—Data-Point Logging checks to see if the Dynamic Logging Control panel only contains one record (row).
A warning is displayed on the Run-Time Manager screen if more than one record exists, but Data-Point Logging continues to run.

At task initialization, Data-Point Logging verifies it is set to run in the SHARED domain. If not, Data-Point Logging reports the error on the Run-Time Manager screen, pauses for one second, and terminates.

Error Detection at Run Time

During dynamic data-point logging, an error message is generated when any of the following occurs:

- An invalid tag name is specified.
- A tag created in the USER domain is specified.
- A Table Name/Schema Name entry in the Data-Point Logging Control panel does not have a corresponding entry in the Data-Point Schema Control panel.

Messages

This section references the directory as FLAPP when discussing errors associated with files in your FactoryLink application directory.

Startup Error Messages

The following messages report error conditions that occur at Data-Point Logging task startup.

Bad size for CT # *record_number*

Cause: (Task terminated.) A discrepancy exists between the indicated .CT file size and the file size specified in the Data-Point Logging task.

Action: Rebuild the .CT file by forcing a ctgen of the Data-Point Logging task using `ctgen -v2 dplogger`.

Can't open CT archive *file_name*

Cause: (Task terminated.) This .CT archive file is missing.

Action: Rebuild the .CT file by forcing a ctgen of the Data-Point Logging task using `ctgen -v2 dplogger`. Call Customer Support if Data-Point Logging does not run.

Can't read CT # *record_number* in CT archive *file_name*

Cause: (Task terminated.) This .CT archive file is corrupt.

Action: Rebuild the .CT file by forcing a ctgen of the Data-Point Logging task using `ctgen -v2 dplogger`. Call Customer Support if Data-Point Logging does not run.

Database alias name not supplied for table name: *table_name*

Cause: This data-point logging table does not have a Database Alias Name entry.

Action: Enter a valid Database Alias Name.

Historian mailbox not supplied for table name *table_name*

Cause: This data-point logging table does not have an Historian Mailbox entry.

Action: Enter a valid Historian Mailbox name.

Loading CT archive *file_name*

Cause: This .CT file is being loaded.

Action: None. This is a status message only.

Loading data-point save file *file_name*

Cause: This data-point save file is being loaded.

Action: None. This is a status message only.

No CTs in CT archive *file_name*

Cause: (Task terminated.) No configuration data exists in this .CT archive file.

Action: Rebuild the .CT file by forcing a ctgen of Data-Point Logging using `ctgen -v2 dplogger`. Call Customer Support if the task does not run.

No domain name for application directory *directory_name*

Cause: (Task terminated.) The domain is not defined.

Action: Define the environment variable `FLDOMAIN`.

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No jobs configured in CT archive *file_name*

Cause: (Task terminated.) The Data-Point Logging Control panel must have at least one row of data.

Action: Add a row to the Data-Point Logging Control panel.

Out of RAM

Cause: (Task terminated.) Not enough memory remains to load FactoryLink.

Action: Either add more memory or reduce memory consumption.

Task cannot run in domain USER

Cause: (Task terminated.) The USER domain is specified.

Action: Start the task in the SHARED domain.

Task initialization failed

Cause: (Task terminated.) The Data-Point Logging task failed to register with the kernel.

Action: Verify FactoryLink is up and running by using `flshm -lum`. Also verify the task is a purchased option. Call Customer Support if Data-Point Logging does not run.

The table *table_name* is not valid

Cause: A Table Name/Schema Name entry in the Data-Point Logging Control panel does not have a corresponding entry in the Data-Point Schema Control panel.

Action: Enter the missing entry in the Data-Point Schema Control panel.

Run-Time Error Messages

The following messages report error conditions that occur during Data-Point Logging task run-time operation.

Can't open log file

Cause: The error log file could not be opened.

Action: Check to see if the disk is full. If so, free up adequate disk space.

Creation of save point file *file_name* failed

- Cause: The data-point save file is not created, possibly because an invalid path is specified in the Command File Tag.
- Action: Check the syntax of the Command File Tag entry.

Dynamic request is being processed

- Cause: A dynamic logging request is being processed.
- Action: None. This is a status message only.

Dynamic request was successful

- Cause: The dynamic logging request is successful.
- Action: None. This is a status message only.

Error attaching to database *database_name* <db_specific_error_message>

- Cause: Depends on content of <db_specific_error_message>.
- Action: Depends on content of <db_specific_error_message>.

Error creating table *table_name* <db_specific_error_message>

- Cause: Depends on content of <db_specific_error_message>.
- Action: Depends on content of <db_specific_error_message>.

Error executing cursor for sql statement *SQL_statement* <db_specific_error_message>

- Cause: Depends on content of <db_specific_error_message>.
- Action: Depends on content of <db_specific_error_message>.

Error initializing cursor for sql statement *SQL_statement* <db_specific_error_message>

- Cause: Depends on content of <db_specific_error_message>.
- Action: Depends on content of <db_specific_error_message>.

Error occurred during reloading of save point file. Please view log file

- Cause: An error occurred while reloading the data-point save file.
- Action: Check the error log file.

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Error preparing cursor for sql statement *<db_specific_error_message>*

Cause: Depends on content of *<db_specific_error_message>*.

Action: Depends on content of *<db_specific_error_message>*.

Global tag *tag_name* not found

Cause: (Task terminated.) Possibly the global tag SECTIME or the global tag DPLOGHISTMBX is missing.

Action: Run FLCONV.

Invalid configuration for tag *tag_name* in table *table_name*

Cause: No logging method is specified for this tag.

Action: Specify one or more logging methods for the tag.

Invalid syntax in command *{LOG/REMOVE}*

Cause: Incorrect syntax is used in a LOG or REMOVE statement.

Action: Check the command syntax.

Multiple dynamic control records are not supported

Cause: Data-Point Logging only reads the first dynamic logging control record. All other rows in this panel are ignored.

Action: Remove all dynamic logging control records except the first.

Table *table_name* is defined more than once

Cause: (Task terminated.) A table name can only be referenced once in the Data-Point Logging Control panel.

Action: Remove one of the references.

The table *table_name* is not valid

Cause: The table specified in a dynamic logging command does not exist in the Data-Point Logging Control panel.

Action: Enter the name of this table in the Table Name field in the Data-Point Logging Control panel.

The tag *tag_name* is not valid. Error *<err_msg>*

Cause: An invalid tag name is specified.

Action: Specify a valid FactoryLink tag name. *<err_msg>* further describes why the tag is invalid.

Unable to remove tag *tag_name*

Cause: Tag(s) specified in a REMOVE statement cannot be removed.

Action: Check the tag name specified in the REMOVE command.

Was not able to read save point file *file_name*

Cause: This data-point save file was not read, possibly because it does not exist or it exists in a directory other than the default directory.

Action: Create one if the data-point save file does not exist. Specify the full path in the Command File Tag entry if the file exists in a directory other than the default directory,

- **DATA-POINT LOGGING**
- *Logging Messages and Codes*
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DDE Client

Principles of Operation

Dynamic Data Exchange (DDE) is a form of interprocess communication used by many Windows applications to automatically update data and to regulate how and when data is passed between applications. Because DDE protocol is well-defined, two applications that follow the protocol can communicate with each other even though neither application was explicitly written to work with the other. DDE allows you to perform data display techniques in any software package supporting DDE using FactoryLink data.

The FactoryLink IV system provides both DDE Server and DDE Client functionality.

DDE Server—Use the FactoryLink DDE Server to establish communications between the FactoryLink real-time database and client software products, such as Lotus 123 and Microsoft Excel.

DDE Client—Although the DDE Server is the preferred method for communicating with external DDE applications, you can also use DDE Client to configure bidirectional communication between the real-time database and one or more Windows DDE servers.

You can configure a single FactoryLink system for multiple external DDE servers simultaneously. You set up the FactoryLink DDE Client in the Configuration Manager Main Menu and initiate communication from a FactoryLink application.

DDE Conversations

DDE data exchanges occur via DDE conversations. These DDE conversations consist of a DDE server and a DDE client. DDE servers supply information for client applications; thus, the FactoryLink DDE Server acts as an information source for client applications, such as Excel and Lotus.

Client applications control the DDE conversation and initiate all data requests. You can set up DDE links in external client applications to retrieve data from the real-time database via the FactoryLink DDE Server.

- **DDE CLIENT**
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Establishing a DDE Link

When a DDE client initiates a DDE conversation with the FactoryLink DDE Server using the INITIATE message, the client must specify a formula that consists of an Application, Topic, and Item.

- **Application**—The name of the server application.
- **Topic**—The name of the file containing the exchange data.
- **Item**—The actual data exchanged in a DDE conversation. DDE Client Functions

Use the DDE Client Table to configure bidirectional communications between the FactoryLink real-time database and external Windows applications via a DDE link. This communication is established by entering data in configuration tables that enable the system to read data from and write data to an external DDE server.

Note: Unlike some DDE conversations which can support a variety of clipboard formats, the FactoryLink DDE tasks only support the exchange of ASCII text. Any formatting information associated with the data will be lost as a result of the DDE conversation.

The DDE Client task uses two types of configuration tables:

- **Read/Write Control**—This table allows the user to specify multiple DDE server configurations.
- **Read/Write Information**—This table allows the user to identify DDE item names to be read and transferred to the FactoryLink real-time database or real-time database values are to be written to.

Setting Up DDE Client

Configure the task in the System Configuration Information panel by completing the following fields to set up the FactoryLink DDE Client:

- **Flag**—Enter the flags FSR in the Flag field. These flags allow the DDE Client to automatically load each time FactoryLink is started.
- **Task Name**—Enter the name FLDDECLI to identify the Client task.
- **Path**—Enter the pathname as /bin/fldecli.

READ/WRITE CONTROL PANEL

Perform the following steps to configure the Read/Write Control panel:

- 1 Ensure the domain selected is correct in the Configuration Manager Main Menu Domain Selection box.
- 2 Choose DDE Client from the Configuration Manager Main Menu to display the Read/Write Control panel.

Table Name	DDE Application	DDE Topic	DDE Advise/Unadvise	Exceptio Write

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:

Table Name Name of the Read/Write Table to be defined or modified.

Valid Entry: up to 16 characters

DDE Application Name of the application a DDE link is to be established for. A DDE conversation is characterized by a DDE application and a DDE topic.

Valid Entry: up to 255 characters

DDE Topic Name of the topic a DDE link is to be established for. A DDE conversation is characterized by a DDE application and a DDE topic.

Valid Entry: up to 255 characters

DDE Advise/Unadvise Element whose value causes the corresponding DDE Server to update the client on changes in the Read/Write Table when set to 1 (ON).

- **DDE CLIENT**
- *Read/Write Control Panel*
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	Valid Entry: standard element tag name
	Valid Data Type: digital
Exception Write	Indicator specifying whether writes are to occur upon each change in the value of the elements specified in the DDE Client Read/Write Control panel.
	<p>YES A change of status of any element generates a write of that element value, independently of any triggers or other values.</p> <p>NO No exception processing. Write operations are generated only when the value of the write trigger element is 1 (ON) and its change-status is set. All values are written, regardless of their change-status.</p>
Block Read Trigger	Element whose value initiates a block read of the values specified in the Read/Write Information panel when forced to 1 (ON). The Block Read Trigger is generally defined by another FactoryLink task, such as the Timer, Math & Logic, or Application Editor.
	Valid Entry: standard element tag name
	Valid Data Type: digital
Block Read Disable	Element whose value disables the block read of elements specified in this table when 1 (ON).
	Valid Entry: standard element tag name
	Valid Data Type: digital
Block Read Complete	Element whose value is force-written to 1 (ON) by the DDE Client task whenever any block read operation for this table is completed. If this element is defined when the DDE Client task initializes, its value is force-written to 1 (ON).
	Valid Entry: standard element tag name
	Valid Data Type: digital
Block Read State	Element whose value is 0 (OFF) when a block read of the elements specified in this table is in progress and 1 (ON) when the table is inactive. If this element is defined when the DDE Client task initializes, its value is force-written to 1 (ON).
	Valid Entry: standard element tag name
	Valid Data Type: digital

Block Write Trigger	<p>Element whose value initiates a block write of the values specified in the Read/Write Information panel when forced to 1 (ON). The Block Write Trigger is generally defined in another FactoryLink task, such as the Timer, Math & Logic, or Application Editor.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: digital</p>
Block Write Disable	<p>Element whose value disables a block write to the DDE server specified in this table when 1 (ON).</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: digital</p>
Block Write Complete	<p>Element whose value is force-written to 1 (ON) whenever any block write operation for this table is completed. If this element is defined when the DDE Client task initializes, its value is force-written to 1 (ON).</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: digital</p>
Block Write State	<p>Element whose value is 0 (OFF) when a block write of the elements specified in this table is in progress and 1 (ON) when the table is inactive. If this element is present when the DDE Client task initializes, its value is force-written to 1 (ON).</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: digital</p>
Error/Status Tag Name	<p>Element whose value represents the last error message generated by this DDE Conversations. A value of 0 implies no errors have occurred.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog</p> <p>Other possible error values are listed in the following table.</p>

- **DDE CLIENT**
- *Read/Write Control Panel*
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Error Value	Cause	Actions
1	DDE initiate failed	The DDE Server is not running or is not responding. Verify the server is running and the application and topic names are correct.
2	DDE acknowledge failed	The DDE Server did not respond to the DDE Client request in the time-out period. Verify the server is running and the application and topic names are correct.
3	DDE block peek operation failed	An error occurred during the Peek operation. Verify the server is running and the DDE itemnames are correct.
4	DDE block poke operation failed	An error occurred during the Poke operation. Verify the server is running and the DDE itemnames are correct.
5	DDE block advise operation failed	An error occurred during the Advise operation. Verify the server is running and the DDE itemnames are correct.
6	DDE block unadvise operation failed	An error occurred during the Unadvise operation. Verify the server is running and the DDE itemnames are correct.

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

READ/WRITE INFORMATION PANEL

Perform the following steps to configure the Read/Write Information panel:

- 1 Ensure the domain selected is correct in the Configuration Manager Main Menu Domain Selection box.
- 2 Choose DDE Client from the Configuration Manager Main Menu to display the Read/Write Information panel.

Tag Name	Tag Type	DDE Itemname	

Table Name

- 3 Specify the following information for this panel:

Tag Name Name of the element to be placed in the read/write/advise/unadvise table.

Valid Entry: standard tag name

Valid Data Type: digital, analog, longana, float, message, mailbox

Tag Type Type of FactoryLink element named in the Tag Name field. This is a display-only field.

DDE Itemname Name the DDE server identifies element by. Each tag name is referenced in DDE by a DDE Itemname.

Valid Entry: up to 255 characters

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **DDE CLIENT**
- *DDE Messages*
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DDE MESSAGES

The corresponding message is displayed onscreen in a pop-up dialog whenever a DDE error message occurs. The FactoryLink DDE task can have the following errors:

Server

Advisory for tag already established

Cause: Multiple links exist for an element within a single DDE conversation.

Action: A DDE conversation may only contain one link per element. Establish a new link for the duplicate item to correct the problem.

Can't lock memory

Can't allocate memory

Couldn't allocate memory

Cause: Memory is low.

Action: Stop any unnecessary tasks and/or clear space on the hard drive.

Could not initiate DDE conversation

Cause: The external application for the DDE conversation is not running.

Action: Start the external application and retry the operation.

DDE Send data failed

Cause: The client application is not available to FactoryLink.

Action: Restart the client application.

DDE Server can't register with FactoryLink

Cause: FactoryLink is not available to the client application.

Action: Restart FactoryLink or shut down any unnecessary tasks.

Client

CT file not found.

Cause: The DDE Client cannot find its respective FLDDECLI.CT file.

Action: Shut down FactoryLink and try again.

DDE Client couldn't Register with FactoryLink!

Cause: FactoryLink is not available to an external DDE client.

Action: Ensure the FactoryLink system started and is running in the Windows environment.

DDE Send data Failed!

Cause: DDE Server can not send data to the FactoryLink DDE Client.

Action: Ensure the external DDE server is running and the DDE Client is configured correctly.

Error Reading CT File

Cause: The FLDDECLI.CT file may be corrupted.

Action: Erase the file and try running FactoryLink again.

FLDOMAIN Environment variable not set!

Cause: Undefined environmental variable.

Action: Ensure the environmental variable FLDOMAIN is set to the appropriate domain.

Memory could not be allocated

Cause: Memory is low.

Action: Shutdown unnecessary Windows applications and try again.

Unable to lock memory!

Cause: Memory is low.

Action: Shutdown unnecessary Windows applications and try again.

- **DDE CLIENT**
- *DDE Messages*
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Distributed Alarm Logger

Data collected by FactoryLink is stored as a data element (tag) in a real-time database. Each time data is collected, the value stored in the real-time database for an element is overwritten by the new data.

Using Distributed Alarm Logger, you can establish criteria an alarm will be generated under for any defined data element in the real-time database. If the value for the element meets the criteria established for alarming, an alarm message is displayed on the Alarm Viewer screen for the FactoryLink operator. The element is then monitored throughout the alarm cycle in the Alarm Viewer until the element value no longer meets the alarm criteria.

Establishing the Alarm Criteria

Using Distributed Alarm Logger, you can establish criteria under which an alarm will be generated for any defined data element in the real-time database. If the value for the element meets the criteria established for alarming, an alarm message is displayed on the Alarm Viewer screen for the FactoryLink operator. The element is then monitored throughout the alarm cycle in the Alarm Viewer until the element value no longer meets the alarm criteria.

To establish this alarm, you use three components that the data element value must be checked against:

- Limit
- Condition
- Deadband

Alarm Grouping

Alarms can be grouped to facilitate administration or analysis. Three grouping properties that can be configured for alarms are Group, Area, and Priority:

- Group Name—Assigned to a class of alarms.
- Area—Assigned to each alarm individually.
- Priority—A number hierarchy assigned to each individual alarm.

- **DISTRIBUTED ALARM LOGGER**
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Parent/Child Relationship

Many times the generation of one alarm causes another alarm to be generated. When these relationships exist, you generally do not want to display the additional alarms resulting from the first alarm. These resulting alarms would not be important to you because you already know what has caused the original alarm. This relationship between the alarms is identified as a parent/child relationship.

Alarm Persistence

Alarm persistence stores the current information about the state of active alarms, with the logbook information, and the child alarms at user-defined intervals. At startup, the information is read, preserving important information like initial time, acknowledgment, and logbook information.

Alarm Distribution

Using the FactoryLink Local Area Network, task alarms can be distributed over the network. Each node can share one or more groups of alarms with other nodes. The alarm is originated on the node on which it is defined and is seen and acknowledged from other nodes that have been configured to receive information on that particular alarm. When the alarm is acknowledged, either at the source or at the remote, the source node accepts the acknowledgment and updates the new alarm status. All nodes receiving information on the alarm are updated.

Alarm Logging

If you want to preserve the time of alarm, alarm data, the operator or node that acknowledged the alarm, and logbook entries for historical purposes, you can configure Distributed Alarm Logger to read data from its own elements in the real-time database and send the data to a disk-based relational database or to a text file. Data stored in a relational database is then available for browsing through the FactoryLink Database Browser. Data stored in a text file is available for browsing using any text editor.

DISTRIBUTED ALARM LOGGER SETUP TABLE

The Distributed Alarm Logger Setup Table consists of four panels:

- **General Alarm Setup Control panel**—Identifies the tags used to maintain counts of the various alarm states and the alarms maintained by the Distributed Alarm Logger.
- **Alarm Archive Control panel**—Identifies the database or file where alarm information is logged.
- **Alarm Local Area Network (LAN) Control panel**—Identifies the node and the appropriate mailboxes for distribution of alarms through the FactoryLink Local Area Network. This panel is configured only if you plan to distribute the alarms.
- **Remote Alarm Groups Control panel**—Identifies the remote node alarms are received from, the remote group name, and the connection status.

- **DISTRIBUTED ALARM LOGGER**
- *General Alarm Setup Control Panel*
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GENERAL ALARM SETUP CONTROL PANEL

Perform the following steps to configure the General Alarm Setup Control panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Distributed Alarm Logger Setup in the Configuration Manager Main Menu to display the General Alarm Setup Control panel.

Active Alarms	Global Hide Tag	Unack. Alarms Count Tag	Active Alarms Count Tag	Audible Alarms Count Tag	Print Active Alarms Tag	Active List Print Device

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:

- Active Alarms

Maximum number of active alarms allowed.

If more alarms are active than specified, an error message is displayed and the oldest alarm is removed from the list. When remote time-stamping is used, the oldest alarm may not have the oldest time-stamping.

Valid Entry: numeric value of between 1 and 721 (default = 100)
- Global Hide Tag

Name of the digital tag in the SHARED domain to hide alarms that have the Use Global Hide flag set to YES. These alarms are not processed if this tag has the value 1 (ON).

The global hide cannot be activated if you leave this field blank.

Valid Entry: standard tag name

Valid Data Type: digital

Unack. Alarms Count Tag	<p>Name of the analog tag in the SHARED domain updated to count the number of alarms in the unacknowledged state.</p> <p>A count of the current unacknowledged alarms are not maintained if you leave this field blank.</p> <p>This tag is used to link to an output animation to display a count of the number of unacknowledged alarms.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog</p>
Active Alarms Count Tag	<p>Name of the analog tag in the SHARED domain updated to count the number of alarms.</p> <p>A count of the current active alarms will not be maintained if you leave this field blank.</p> <p>This tag can be used to link to an output animation to display a count of the number of alarms.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog</p>
Audible Alarms Count Tag	<p>Name of the analog tag in the SHARED domain updated to have the number of unacknowledged alarms that have the audible flag set to YES.</p> <p>This tag can be used to link to the Beep animation in a display to get an audible signal when an alarm occurs.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog</p>
Print Active Alarms Tag	<p>Name of the digital tag that causes the Alarm Logger task to update the file {FLAPP}/alarms.txt and print a list of all active alarms and logbook entries when changed to the value 1 (ON).</p> <p>The file {FLAPP}/alarms.txt is an intermediate file overwritten each time a new printout is generated. This file can be used as a digital copy of the last printed active list.</p> <p>Note: To disable printing of return-to-normal messages, specify the -a program argument for the AL_LOG task in the Configuration Manager. Refer to “System Configuration Information Panel” in FactoryLink ECS Reference Guide Chapter 131, “Window Management.”</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: digital</p>

- **DISTRIBUTED ALARM LOGGER**

- *General Alarm Setup Control Panel*

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Active List Print Number of the print device where the active alarm list is routed
Device to be printed. This number corresponds to the line number of the
 print device identified in the Print Spooler Information panel.
 The default 0 disables this function.

Valid Entry: print device number (default = 0)

4 Click on Enter to save the information.

5 Click on Next to go to the Alarm Archive Control panel.

ALARM ARCHIVE CONTROL PANEL

Use the Alarm Archive Control panel to identify the database or files where alarm information is logged.

Database Alias Name	Alarm Table Name	Logbook Table Name	Historian Mailbox	History Max Records	Message Size	Log File Trigger

Buttons: Cancel, Enter, Exit, Next, Prev

Perform the following steps to configure this panel:

1 Specify the following information:

Database Alias Name Unique name identifying a relational database that stores the alarm data. The default is ALOG, but it can be any alphanumeric character string of up to 16 characters.

Note: To configure logging to a text file, configure the Log File Trigger and Log File Directory files on this panel, and either the Log field or the Log Method Tag field on the Alarm Group Control panel.

You must also enter this name in the Database Alias Name field on the appropriate Historian Information panel if you want to log your alarm data to a relational database.

Valid Entry: database name or alphanumeric character string of up to 16 characters (default = ALOG)

Alarm Table Name Unique name for the table in the relational database that stores the alarm data. The default is ALARMS but it can be any alphanumeric character string of up to 16 characters.

- **DISTRIBUTED ALARM LOGGER**

- *Alarm Archive Control Panel*

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Valid Entry: database name or alphanumeric character string of up to 16 characters (default = ALARMS)

Logbook Table Name Unique name for the table in the relational database that stores the alarm logbook data. The default is LOGBOOK, but it can be any alphanumeric character string of up to 16 characters.

Valid Entry: database name or alphanumeric character string of up to 16 characters (default = LOGBOOK)

Historian Mailbox Name of the mailbox tag used to transfer the data to the relational database. The default is ALOG_MBX but it can be any alphanumeric string tag name. You must also enter this tag name in the Historian Mailbox field on the appropriate Historian Mailbox Information panel.

Valid Entry: mailbox tag name or any alphanumeric string tag name (default = ALOG_MBX)

History Max Records Maximum number of records allowed in the database if you are sending data to a dBASE IV Historian. The default is 1000, but you can enter any number. The oldest record is overwritten when the maximum is reached.

The information is disregarded if you are sending data to any other database.

Valid Entry: numeric value (default = 1000)

Message Size Size of the message field when it is saved into the alarm and logbook tables in the relational database. The default is 80 but it can be any number of between 1 and 128.

If the message size is changed after tables have been generated, the existing tables require alteration or dropped from the database to prevent an error condition.

Valid Entry: numeric value between 1 and 128 (default = 80)

Log File Trigger Tag name of the real-time database tag that, when its value is set to 1 (ON), saves current alarm information to a permanent alarm text file, almmddyy.nnn, and a permanent logbook text file, lbmmddyy.nnn, where mmddyy is the current date and nnn is a number from 000 to 999, depending on the number of such archived files for that day.

Valid Entry: standard tag name

Valid Data Type: digital

Logbook Table Name	Historian Mailbox	History Max Records	Message Size	Log File Trigger	*Log File Directory	

Buttons: Cancel, Enter, Exit, Next, Prev

Log File Directory Path and directory where almmddyy.nnn and lbmmddyy.nnn will be stored.

Valid Entry: (default)'{FLAPP}\{FLNAME}\{FLDOMAIN}\{FLUSER}\LOG

- 2 Click on Enter to save the information.
- 3 Click on NEXT to go to the Alarm Local Area Network (LAN) Control panel (if you plan to distribute the alarms. Otherwise, click on Exit to return to the Main Menu.

- **DISTRIBUTED ALARM LOGGER**
- *Alarm Local Area Network (LAN) Control Panel*
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ALARM LOCAL AREA NETWORK (LAN) CONTROL PANEL

Use the Alarm Local Area Network (LAN) Control panel to identify the node and the appropriate mailboxes for distribution of alarms through the FactoryLink Local Area Network. Configure this panel only if you plan to distribute the alarms.

Source Node ID	Network Send Mailbox	Network Receive Mailbox	

Buttons: Cancel, Enter, Exit, Next, Prev

Perform the following steps to configure this panel:

1 Specify the following information:

- Source Node ID

Unique number between 0 and 255 to specify this node on the network. Each node on the network must be identified with a different ID number.

This ID is for distribution of alarms only and has no direct relationship to FactoryLink LAN or to the total number of connections available for your particular protocol.

Valid Entry: numeric value between 0 and 255
- Network Send Mailbox

Name of the mailbox tag in the SHARED domain used by the FactoryLink Local Area Network to communicate with other nodes on the network.

This mailbox tag name is entered in the Tag Name field on the LAN Send Information panel and in the Network Alias field on the LAN Receive Information panel. The Exception Send Flag field on the LAN Send Control panel should be set to YES.

Valid Entry: mailbox tag name

DISTRIBUTED ALARM LOGGER

Alarm Local Area Network (LAN) Control Panel

Network Receive Mailbox Name of the mailbox tag entered in the Tag Name field on the LAN Receive Information panel in the SHARED domain used by the FactoryLink Local Area Network to communicate with other nodes on the network.

- 2 Click on Enter to save the information.
- 3 Click on Next to go to the Remote Alarm Groups Control panel.

- **DISTRIBUTED ALARM LOGGER**
- *Remote Alarm Groups Control Panel*
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REMOTE ALARM GROUPS CONTROL PANEL

Use the Remote Alarm Groups Control panel to identify the remote node alarms are received from, the remote group name, and the connection status.

Remote Node ID	*Remote Groups	Connection Status	

Buttons: Cancel, Enter, Exit, Next, Prev

Perform the following steps to configure this panel:

1 Specify the following information:

Remote Node ID ID of the remote node to get alarms from.

***Remote Groups** List of groups remote alarms will be received from. The asterisk (*) indicates this value can be a tag and/or a fixed string that indicates the remote group name. Use 'ALL to get all remote groups.

Connection Status Tag that contains the status for the connection to the remote node. This can be an analog or message tag type. The tag assumes one of the following values at connection:

0 - Off line

1 - On line

2 - Group Binding

3 - Alarm Binding

2 Click on Enter to save the information.

3 Click on Exit to return to the Main Menu.

DISTRIBUTED ALARM DEFINITIONS TABLE

The Distributed Alarm Definitions configuration table consists of three panels. Both the Distributed Alarm Logger and the Alarm Viewer via Graphics read information provided in these panels.

- Alarm Group Control panel—Identifies the properties assigned to each alarm group.
- Alarm Definition Information panel—Identifies the alarms associated with each group and the properties of each individual alarm.
- Alarm Relations Information panel—Identifies the parent/child relationships between the alarms.

The Distributed Alarm Logging Definition table is filled out in the SHARED domain.

- **DISTRIBUTED ALARM LOGGER**
- *Alarm Group Control Panel*
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ALARM GROUP CONTROL PANEL

Perform the following steps to configure the Alarm Group Control panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Distributed Alarm Definitions in the Configuration Manager Main Menu to display the Alarm Group Control panel.

Group Name	Group Text	Group Composite Status Tag	Group Number Active Tag	Ack	Aud

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:

Group Name

Uppercase alphanumeric string of 1 to 16 characters that specifies the Alarm Group name.
 Valid Entry: uppercase alphanumeric string of 1 to 16 characters

Group Text

Alphanumeric string of 1 to 40 characters that specifies the alarm message text displayed for all alarms belonging to this group. This text is normally placed in front of the individual alarm text.
 Valid Entry: alphanumeric string of 1 to 40 characters

Group Composite Status Tag

Name of the analog tag that contains a number representing the composite status of the alarm group. Five statuses are valid:

0 (IDLE) No alarms in the group are active.

1 (NORMAL) At least one alarm in the alarm group is unacknowledged and has returned to normal.

- 2 (ACK) At least one alarm in the alarm group is active and has been acknowledged.
- 3 (ACTIVE) At least one alarm in the alarm group is active and unacknowledged.
- 11 (NORM/ACK) At least one alarm in the alarm group is unacknowledged and has returned to normal and one other alarm is active and acknowledged.

Valid Entry: standard tag name

Valid Data Type: analog

Group Number Name of the tag that contains the number of active alarms in this
Active Tag group

Valid Entry: standard tag name

Valid Data Type: analog

ACK Indicates whether or not an operator needs to acknowledge the alarms belonging to this group. This can be one of the following:

NO No operator acknowledgment required. The alarm disappears from the active list when it returns to normal. This is the default setting.

YES The operator must acknowledge the alarm. The acknowledge time and operator are logged (if configured).

RST The operator must acknowledge the alarm but cannot do so until the alarm has returned to normal. In conjunction with the alarm status it can be used to reset alarms in the PLC or controller.

If this field is set to YES or RST, the Unack Alarms Count Tag field in the General Alarm Setup panel must be set for the alarms in the unacknowledged state to be counted.

- **DISTRIBUTED ALARM LOGGER**
- *Alarm Group Control Panel*
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AUD Indicates whether or not the alarms belonging to this group produce an audible signal. This can be one of the following:

NO When an alarm is generated, an audible signal is not produced for this alarm group. This is the default setting.

YES When an alarm is generated, an audible signal is produced for this alarm group.

If this field is set to YES and a tag is assigned to the field, the alarms in this group are included in the count the Audible Alarms Count Tag in the General Alarm Setup panel maintains.

Alarm Group Control

Edit

View

Utilities

Exit

Help

Alarm Stat Print Dev	Log	Log Method Tag	Initial FG Clr	Initial BG Clr	Initial Blink	Ack FG Clr	Ack BG Clr	Ack Blink

Cancel

Enter

Exit

Next

Prev

Alarm Stat Print
Dev

Number of the print device where the alarm state changes are routed for printing. This number corresponds to the line number of the print device identified in the Print Spooler Information panel. The default blank or 0 disables this function.

The formats used for the printing can be adjusted by changing the PRTINI, PRTACK, or PRTNRM entries in the {FLINK}/msg/al_fmt.txt file for the print to the states initial, normal and acknowledged.

Note: To disable printing of return-to-normal messages, specify the -a program argument for the AL_LOG task in the Configuration Manager. Refer to “System Configuration Information Panel” in FactoryLink ECS Reference Guide Chapter 131, “Window Management.”

Valid Entry: print device number

LOG Indicates whether or not an alarm belonging to this group is logged in the alarm table after it is removed from the active list. This can be one of the following:

NO A cleared alarm is not logged to the relational database or file. This is the default setting.

YES A cleared alarm is logged to the relational database or file.

If this field is set to YES and a tag is assigned to the field, the alarms in this group are included in the count the Active Alarms Count Tag in the General Alarm Setup panel maintains.

Log Method Tag Tagname of a real-time database element that allows the operator to change the logging method at run time. The operator can enter one of three valid values:

0 (NO) default--alarm logging disabled)

1 (YES) alarm logging enabled to a database historian

2 (FILE) alarm logging enabled to almmddy.nnn and logbook entry logging enabled to lbmmddy.nnn where mmddy is the current date and nnn is a number from 000 to 999, depending on the number of archived alarm files for that day.

Valid Entry: standard tag name

Valid Data Type: analog

- **DISTRIBUTED ALARM LOGGER**
- *Alarm Group Control Panel*
-
-

Alarm Group Control

EditViewUtilitiesExitHelp

Initial FG Clr	Initial BG Clr	Initial Blink	Ack FG Clr	Ack BG Clr	Ack Blink	Normal FG Clr	Normal BG Clr	Normal Blink	Group Hide Tag

CancelEnterExit

NextPrev

Initial FG Clr Foreground color of an alarm in the initial state. Red is the default setting.

Initial BG Color Background color of an alarm in the initial state. Black is the default setting.

Initial Blink Indicate whether or not the alarm blinks in the initial state. The speed may be chosen. Yes blinks slowly. The default is No.

ACK FG Color Foreground color of an alarm in the acknowledged state. Green is the default setting.

ACK BG Color Background color of an alarm in the acknowledged state. Black is the default setting.

ACK Blink Indicates whether or not the alarm blinks in the acknowledged state. No is the default setting.

Normal FG Color Foreground color of an alarm in the normal state. Yellow is the default setting.

Normal BG Color Background color of an alarm in the normal state. Black is the default setting.

Normal Blink Indicates whether or not the alarm blinks in the normal state. No is the default setting.

Group Hide Tag Name of the digital tag in the SHARED domain that hides alarms for this group. If this tag has the value ON, these alarms are not processed.

The Group Hide cannot be activated if you leave this field blank.

Valid Entry: **standard tag name**

Valid Data Type: **digital**

- 4 Click on Enter to save the information.
- 5 Click on Next to go to the Alarm Definition Information panel.

- **DISTRIBUTED ALARM LOGGER**
- *Alarm Definition Information Panel*
-
-

ALARM DEFINITION INFORMATION PANEL

Use the Alarm Definition Information panel to identify the alarms associated with each group and the properties of each individual alarm.

Unique Alarm ID	Alarm Tag Name	Cond.	*Limit	*Deadband	Message Text

Group Name

Perform the following steps to configure this panel:

- Specify the following information:

Unique Alarm ID

Unique number between 1 and 999999 to identify the alarm. Each alarm on the network must be identified with a different number.
 Valid Entry: numeric value between 1 and 999999

Alarm Tag Name

Name of the tag whose value in the real-time database is evaluated for an alarm condition.
 Complete this field if you are distributing alarms and this is the server node for this alarm.
 Leave this field blank if you are distributing alarms and this is a client node for this alarm. The alarm ID is used to identify the alarm. The alarms are updated only over the network in this case.
 If a tag is used in either the *Limit or the *Deadband fields, they must be the same data type as this alarm tag. If the deadband tag is not being used, a message type tag can also be used by the limit and alarm.
 Valid Entry: standard tag name
 Valid Data Type: digital, analog, longana, float

Cond. Condition the alarm tag type or alarm ID is checked under. This can be one of the following:

- OFF Off state or 0 for a digital tag
- ON On state or 1 for a digital tag
- TGL Changed status
- <, LT, LO, LOLO Less than the limit
- >, GT, HI, HIHI Greater than the limit
- <= or LE Less than or Equal to the limit
- >= or GE Greater than or Equal to the limit
- = or EQ Equal to the limit
- <> or NE Not Equal to the limit

***Limit** Name of a tag or a constant whose value equals the value the alarm condition exists at.

If a tag is used, it must be the same data type as the tag in the Alarm Tag Name and the *Deadband fields.

If the *Deadband field contains a tag, the message type tag cannot be used.

Valid Entry: standard tag name or constant

Valid Data Type: analog, longana, float, message

***Deadband** Name of a tag or a constant whose value equals the value above or below the limit the alarm remains active.

The deadband works in conjunction with the condition and limit specified for the alarm. Once the alarm is triggered, it remains active until it moves past its limit by the deadband amount.

If a tag is used, it must be the same data type as the tag in the Alarm Tag Name and the *Limit fields.

Valid Entry: standard tag name or constant

Valid Data Type: analog, longana, float

Message Text Alphanumeric string specifying the message text displayed for this individual alarm. This text is normally displayed after the group alarm text.

Valid Entry: alphanumeric string between 1 and 160 (English) characters

- **DISTRIBUTED ALARM LOGGER**
- *Alarm Definition Information Panel*
-
-

Message text specifications can include two types of variable specifiers:

- 1) %s -- C-style, described in “Using Format Specifiers” of the *FactoryLink Fundamentals*. If you are using C-style specifiers, and you want to “freeze” the message text initially displayed when an alarm occurs, you must have included the -f switch as a program argument for the Distributed Alarm Viewer task. Refer to“System Configuration Information Panel” in FactoryLink ECS Reference Guide Chapter 131, “Window Management” for more information.
- 2) \$VAn\$ -- Four different variable specifiers that are filled in at run time with information contained in the tags (Variable 1, Variable 2, Variable 3, and Variable 4) described below. The message can include more than one instance of each variable, but only four different variables are allowed, with the following constraints on the run-time display:

If the number of different \$VAn\$ specifiers is...	The maximum number of characters displayed per specifier is ...
4	11
3	14
2	22
1	44

Message text exceeding the maximum allowable number of characters per variable will be truncated on the display.

Variable 1 Tag	Variable 2 Tag	Variable 3 Tag	Variable 4 Tag	Priority	Area Name	Time-stamp Tag

Group Name:

Variable 1: Name of the tag whose value is used as part of the alarm message at run time and to store additional information in the database or file if the alarms are being logged.

If you enter variable specifiers within the text in the Message Text field, this value is substituted for the first specifier at run time.

Valid Entry: standard tag name

Valid Data Type: analog, longana, float, message

Variable 2: Name of the tag whose value is used as part of the alarm message at run time and to store additional information in the database or file if the alarms are being logged.

If you enter variable specifiers within the text in the Message Text field, this value is substituted for the second specifier at run time.

Valid Entry: standard tag name

Valid Data Type: analog, longana, float, message

Variable 3: Name of the tag whose value is used as part of the alarm message at run time and to store additional information in the database or file if the alarms are being logged.

If you enter variable specifiers within the text in the Message Text field, this value is substituted for the third specifier at run time.

- **DISTRIBUTED ALARM LOGGER**

- *Alarm Definition Information Panel*

-
-

Valid Entry: **standard tag name**

Valid Data Type: **analog, longana, float, message**

Variable 4: Name of the tag whose value is used as part of the alarm message at run time and to store additional information in the database or file if the alarms are being logged.

If you enter variable specifiers within the text in the Message Text field, this value is substituted for the fourth specifier at run time.

Valid Entry: **standard tag name**

Valid Data Type: **analog, longana, float, message**

Priority Number between 1 and 9999 to specify the priority of the alarm for filtering and sorting purposes.

Valid Entry: **numeric value between 1 and 9999 (default = 1)**

Area Name Alphanumeric string of 1 to 16 characters that specifies the area the alarm resides in for filtering and sorting purposes.

If you are distributing your alarms along the network, use this field to designate and sort by server/client or local/remote.

Valid Entry: **alphanumeric string of 1 to 16 characters**

Time-stamp Tag Name of a message tag to specify the exact time the alarm occurred.

This message is supplied with the alarm tag change.

If no tag is supplied here, the time-stamping is determined when the change is detected by Alarm Logging.

This tag should be filled with the correct value before the alarm tag is changed.

Valid Entry: **standard tag name**

Valid Data Type: **message**

Priority	Area Name	Time-stamp Tag	Time-stamp Format	Use Global Hide	Alarm Hide Tag	Status Tag

Group Name:

Time-stamp Format Format used by the tag in the Time-Stamping Tag field. This can be one of the following:

- NULL Time-stamping format not used
- USA USA time format (yymmddhhmmss)
- EUROPE European time format (ddmmyyhhmmss)
- USA_HS USA time format with 1/1000 sec.
(yymmddhhmmssstt)
- EUR_HS European time format with 1/1000 sec.
- USA_L Long USA time format
- EUROPE_L Long European time format
- USA_HSL Long USA time format with 1/1000 sec.
- EUR_HSL Long European time format with 1/1000 sec.

The formats can be adjusted in the {FLINK}/msg/EN/al_fmt.txt file if needed. If you change values in this file, you may want to save a copy of the changes, as the installation of a new version of FactoryLink overwrites user-edited files.

Use Global Hide Indicates whether or not the alarm is displayed when the Global Hide Tag is set. This can be one of the following:

- **DISTRIBUTED ALARM LOGGER**

- *Alarm Definition Information Panel*

-
-

NO When an alarm is generated and the Global Hide Tag is set to 1 (ON) or 0 (OFF), the alarm is displayed.

YES When an alarm is generated and the Global Hide Tag is set to 1 (ON), the alarm is not displayed. When an alarm is generated and the Global Hide Tag is set to 0 (OFF), the alarm is displayed.

If yes, the Global Hide Tag field in the General Alarm Setup Control panel must be entered for this feature to work.

Alarm Hide Tag Name of the digital tag whose value hides the alarm. If this tag has the value 1 (ON), the alarm is not processed. Reusing the same tag for other individual alarms is accepted.

The individual alarm is not hidden if you leave this field blank.

If the tag specified in this field is not already defined, a Tag Definition dialog is displayed when you click on Enter with a tag type of digital in the Type field and SHARED in the Domain field. Click on OK to accept these defaults.

Valid Entry: standard tag name

Valid Data Type: digital

Status Tag Name of the analog or digital tag that represents the status of this alarm in the active alarm list. The run-time status can be one of the following.

Tag Type	State	Entry	Run-time Status
Analog	Initial	INI	3
	Acknowledged	ACK	2
	Normal	NRM	1
	Idle	IDLE	0
Digital	Initial	INI	0
	Acknowledged	ACK	1
	Normal	NRM	0
	Idle	IDLE	0

- 2 Click on Enter to save the information.
- 3 Click on Next to go to the Alarm Relations Information panel.

- **DISTRIBUTED ALARM LOGGER**
- *Alarm Relations Information Panel*
-
-

ALARM RELATIONS INFORMATION PANEL

Use the Alarm Relations Information panel to identify the parent/child relationships between the alarms.

Parent Alarm ID	Child Alarm Delay (sec)	Child Recovery Delay (sec)	

Alarm ID

Perform the following steps to configure this panel:

- Specify the following information:

Parent Alarm ID

Alarm ID assigned to the parent alarm. A separate entry is required for each additional parent if the child is subordinate to more than one alarm.

Valid Entry: parent alarm ID

Child Alarm Delay (sec)

Number of seconds (up to 30,000) to specify the delay between the activation of the parent alarm and the activation of the child alarm.

If no delay time is entered, the parent always hides the child alarm.

If a time between 1 and 30,000 seconds is entered and the child alarm is activated within that period, the child alarm is not displayed.

If a time between 1 and 30,000 seconds is entered and the child is activated after that period, the child alarm is displayed as its own alarm.

Valid Entry: numeric value of between 1 and 30,000

Child Recovery Delay (sec) Number of seconds (up to 30,000) to specify the delay between the return to normal of the parent alarm and the return to normal of the child alarm.

If a time between 1 and 30000 seconds is entered and within that period the parent returns to normal and the child returns to normal, the child alarm is not displayed.

If a time between 1 and 30000 seconds is entered and within that period the parent returns to normal and the child does not, the child enters the initial alarm state.

If no delay time is entered, the child immediately enters the initial alarm state if the parent returns to normal and the child does not.

Valid Entry: numeric value of between 1 and 30000

- 2 Click on Enter to save the information.
- 3 Click on Exit to return to the Main Menu.

- **DISTRIBUTED ALARM LOGGER**
- *Distributed Alarm Viewer Setup Table*
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DISTRIBUTED ALARM VIEWER SETUP TABLE

The Distributed Alarm Viewer Setup configuration table consists of three panels.

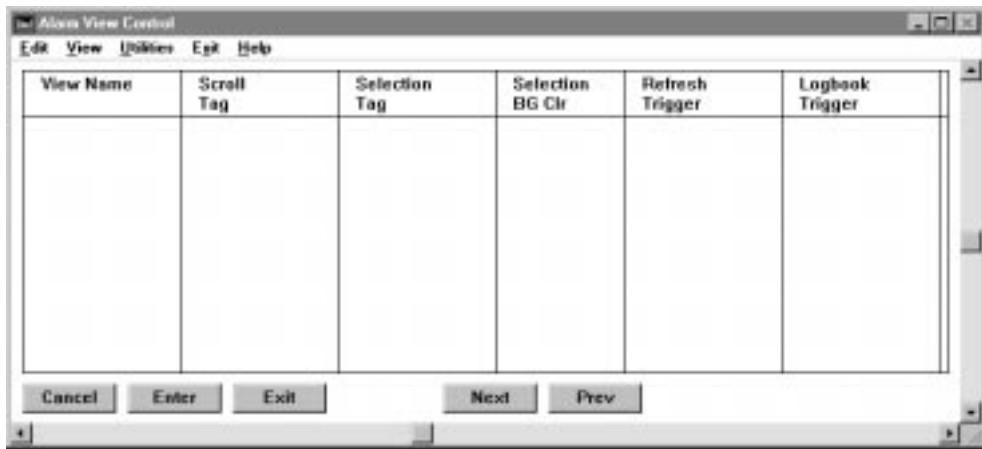
- **Alarm View Control panel**—Identifies the selection and filtering properties for the viewing of alarms.
- **Alarm View Output Information panel**—Identifies the tags used for the animation of the viewer.
- **Alarm View Logbook Information panel**—Identifies the tags for input and output messages and the number of lines for each in the logbook.

The Distributed Alarm Viewer Setup table is configured in the USER domain.

ALARM VIEW CONTROL PANEL

Perform the following steps to configure the Alarm View Control panel:

- 1 Ensure the domain selected is USER in the Configuration Manager Domain Selection box.
- 2 Choose Distributed Alarm Viewer Setup in the Configuration Manager Main Menu to display the Alarm View Control panel.



- 3 Specify the following information for this panel:

View Name Alphanumeric string of 1 to 16 characters to specify the table name for the view.

Valid Entry: alphanumeric string of 1 to 16 characters
(default views = BANNER or VIEWER)

Scroll Tag Name of an analog tag in the USER domain representing the offset in lines from the first active alarm in this filter. Add or subtract the desired number of lines to move the alarm window.

Valid Entry: standard tag name

Valid Data Type: analog

Selection Tag Name of an analog tag in the USER domain representing the offset in lines from the first line visible on the screen. This alarm has a different background color. The alarm in the line is used for single acknowledgments and logbook functions.

The viewer corrects an invalid tag value in the Scroll Tag field.

- **DISTRIBUTED ALARM LOGGER**

- *Alarm View Control Panel*

-
-

	Valid Entry: standard tag name Valid Data Type: analog
Selection BG Clr	Color of the selected alarm line. None is the default.
Refresh Trigger	Name of the digital tag in the USER domain used to refresh the Alarm Lines. This option can be used to refresh an alarm line with variables. Valid Entry: standard tag name Valid Data Type: digital
Logbook Trigger	Name of the digital tag in the USER domain used to attach a logbook entry to the selected alarm. Valid Entry: standard tag name Valid Data Type: digital
Single Ack Tag	Name of the digital tag in the USER domain used to acknowledge the alarm currently selected by the selection tag. If no selection tag is defined, the first alarm is acknowledged. Valid Entry: standard tag name Valid Data Type: digital
View Ack Tag	Name of the digital tag in the USER domain used to acknowledge all alarms currently selected by this view. Valid Entry: standard tag name Valid Data Type: digital
Group Filter	Name of a message tag in the USER domain or an alphanumeric constant of 1 to 40 characters to specify the default value for filtering by alarm groups on the active alarm list. When changed, the view is rebuilt to match the current selection. Specify the alarm groups you want to include in the filter separated by a semi-colon (;). Use 'ALL' to specify all groups. This field is case sensitive. Group filters are used to specify which groups of alarms to view. Valid Entry: standard tag name or alphanumeric constant of 1 to 40 characters Valid Data Type: message

Priority Filter Name of an analog tag in the USER domain or a number between 1 and 9999 to specify the default value for the filtering by priority on the active alarm list. When changed, the view is rebuilt to match the current selection.

All alarms with a higher priority are selected for the view.

Valid Entry: standard tag name or numeric value between 1 and 9999

Valid Data Type: analog

Area Filter Name of a message tag in the USER domain or an alphanumeric string of 1 to 40 characters to specify the default value for filtering by area on the active alarm list. When changed the view is rebuilt to match the current selection. 'ALL' is the default.

Specify the areas you want to include in the filter separated by a semi-colon (;). Use 'ALL' to specify all areas.

Valid Entry: standard tag name or alphanumeric string of 1 to 40 characters (default = 'ALL')

Valid Data Type: message

Status Filter Name of an analog tag in the USER domain or constant to specify the default value for filtering by status on the active alarm list. When changed, the view is rebuilt to match the current selection. 'ALL' is the default.

Distributed Alarm Logger has predefined the constant values allowed in this field. This can be one of the following:

Entry	Description	Analog value
ALL	All alarm states.	0
NORMAL	Alarm in normal state.	1
ACK	Alarms in acknowledged state.	2
INITIAL	Alarms in initial/active state.	3
UNACK	Unacknowledged.	4

Sort Method Name of an analog tag in the USER domain or constant to specify the sorting of the alarms in this view. When changed, the view is rebuilt to match the current selection. The default is ITIME.

- **DISTRIBUTED ALARM LOGGER**
- *Alarm View Control Panel*
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Distributed Alarm Logger has predefined the constant values allowed in this field. This can be one of the following.

Entry	Description	Analog value
ITIME	Initial alarm time.	0
R_ITIME	Reversed initial alarm time.	1
ATIME	Acknowledge time.	2
R_ETIME	Reversed acknowledge time.	3
NTIME	Normal Time.	4
R_NTIME	Reversed normal time.	5
PRI0	Alarm priority.	6
AREA	Alarm area.	7
GROUP	Alarm group.	8
STATUS	Alarm status.	9
AID	Unique alarm identification.	10
FUNACK	First unacknowledged.	11

If two alarms have the same sort item, the sort takes place on the Alarm Sequence number that is unique.

Line Format Format of the presented lines.

Distributed Alarm Logger has predefined nine views. This can be one of the following:

```

VIEW_1  $DAT$ $TIM$ $LOG$ $TAG16$ $ACK$ $STS8$
        $GMS$ $MSG$

VIEW_2  $TIM$ $TAG16$ $GMS$ $MSG$

VIEW_3  $DAT$ $TIM$ $LOG$ $AID5$ $STS8$ $GMS$
        $MSG$

VIEW_4  $LOG$ $OPR8$ $TIM$ $TAG16$ $GMS$ $MSG$

VIEW_5  $TIM$ : $STS8$ : $GMS$ $TAG16$

```

```
VIEW_6 $TIM$ : $OPR8$ : $AID04$ $GMS$ $MSG$  
VIEW_7 $TIM$ # $LAN3$ $OPR8$ $TIM$ $TAG16$  
      $GMS$ $MSG$  
VIEW_8 $LAN3$: $AID4$ > $TIM$ $STS8$ $GMS$ $MSG$  
VIEW_9 $LOG$ $LAN3$: $AID4$ > $TIM$ : $GMS$  
      $MSG$
```

The following tokens are used to define the lines:

AID	Alarm ID number
TAG	TAG name
STS	Alarm Status (INI, ACK, NRM)
DAT	Initial Date
TIM	Initial Time
ADT	Acknowledge Date
ATM	Acknowledge Time
OPR	Acknowledge Operator
NDT	Normal Date
NTM	Normal Time
GMS	Group Message
MSG	Alarm Message
VA1	Variable 1
VA2	Variable 2
VA3	Variable 3
VA4	Variable 4
GRP	Group Name
ARE	Area Name
PRI	Alarm Priority
LOG	Exclamation mark (!) indicating logbook entry
LAN	LAN ID from originating node

- **DISTRIBUTED ALARM LOGGER**

- *Alarm View Control Panel*

-
-

ACK Asterisk (*) indicating alarm needs acknowledgment

The numbers included with the tokens indicate the character length of the token. The character length can be specified as 1 to 99.

More line formats can be added if needed.

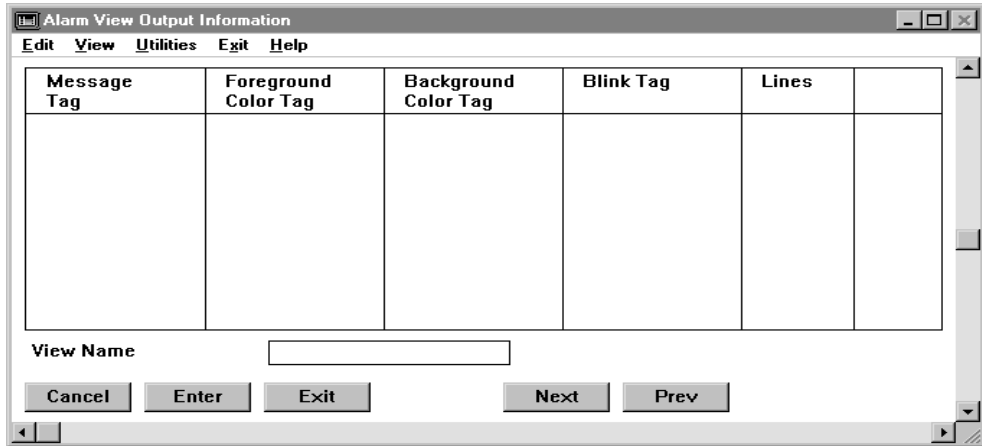
Default BG Clr Background color for blank lines. Press CTRL+K to retrieve a list of the available colors. Black is the default.

4 Click on Enter to save the information.

5 Click on Next to go to the Alarm View Output Information panel.

ALARM VIEW OUTPUT INFORMATION PANEL

Use the Alarm View Output Information panel to identify the tags used for the animation of the Viewer.



Perform the following steps to configure this panel:

1 Specify the following information:

- | | |
|----------------------|--|
| Message Tag | Name of the first tag of a message tag array used to store the alarm lines. The maximum length of an alarm line can be 128 characters, depending on the format. When defining the Message tag, make the length large enough to hold all alarm information.
Valid Entry: standard tag name
Valid Data Type: message |
| Foreground Color Tag | Name of the first tag of an analog tag array used to set the alarm line foreground color.
Valid Entry: standard tag name
Valid Data Type: analog |
| Background Color Tag | Name of the first tag of an analog tag array used to set the alarm line background color.
Valid Entry: standard tag name
Valid Data Type: analog |
| Blink Tag | Name of the first tag of an analog tag array used to set the alarm line blinking state. |

- **DISTRIBUTED ALARM LOGGER**
- *Alarm View Output Information Panel*
-
-

Valid Entry: **standard tag name**

Valid Data Type: **analog**

Lines Unique number between 1 and 99 that specifies the number of lines in the display. All arrays should have this number of tags left on top of the first tag.

For example, when defining line_tag[8] and lines = 12, minimum array size must be 21.

Valid Entry: **numeric value of between 1 and 99**

- 2 Click on Enter to save the information.
- 3 Click on Next to go to the Alarm View Logbook Information panel.

ALARM VIEW LOGBOOK INFORMATION PANEL

Use the Perform the following steps to configure the Alarm View Logbook Information panel to identify the tags for input and output messages and the number of lines for each entry in the logbook.

Text Input Tag	Lines	Text Output Tag	Lines	

View Name

Perform the following steps to configure this panel:

1 Specify the following information:

- | | |
|-----------------|--|
| Text Input Tag | Name of the first tag of a message tag array used to store the logbook entry.
Valid Entry: standard tag name
Valid Data Type: message |
| Lines | Number between 1 and 99 that specifies the number of lines in the display. All arrays should have this number of tags left on top of the first tag.
For example, when defining line_tag[8] and lines = 12, minimum array size must be 21.
Valid Entry: numeric value of between 1 and 99 |
| Text Output Tag | Name of the first tag of a message tag array used to read out the logbook entry.
Valid Entry: standard tag name
Valid Data Type: message |

- **DISTRIBUTED ALARM LOGGER**
- *Alarm View Logbook Information Panel*
-
-

Lines Number between 1 and 99 that specifies the number of lines in the display. All arrays should have this number of tags left on top of the first tag.

For example, when defining `line_tag[8]` and `lines = 12`, minimum array size must be 21.

Valid Entry: numeric value of between 1 and 99

- 2 Click on Enter to save the information.
- 3 Click on Exit to return to the Main Menu.

DISTRIBUTED ALARM LOGGING MESSAGES

If Distributed Alarm Logger encounters any problems during run time, an error message is displayed on the Run-Time Manager screen next to the name of the Alarm Logging task on the SHARED domain window and next to the name of the Alarm Viewer task on the USER domain window.

This section lists all messages that can occur during Distributed Alarm Logger run time, describes their causes, and provides corrective actions.

Alarm Logging Messages

Deadband tag has a different type at Unique Alarm ID *number*

Cause: Alarm tag and limit tag are different types.

Action: Correct the type of the alarm tag or limit tag. They must agree.

Duplicate Unique Alarm ID *number* used in CT file

Cause: The program detected a duplicate Alarm ID number in the software. This check is only performed when a -d or -l parameter is specified in the program arguments.

Action: Remove the duplicate from the Alarm Logging definition.

Error (%d) on set change flag

Cause: An internal call to set a change flag on a tag has failed.

Action: Report the error to Customer Support.

Empty CT file...

Cause: No tables are found in the CT file.

Action: The configuration is probably invalid. Fill in the information and define an alarm.

Error locating a child with Unique Alarm ID *number*

Cause: The program is not able to find an Alarm ID number used to define a child. This normally means a corrupted CT file.

Action: Run `ctgen -r`.

- **DISTRIBUTED ALARM LOGGER**
- *Distributed Alarm Logging Messages*
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Error locating a parent *Unique Alarm ID* for alarm '*tagname*'

- Cause:** The program is not able to find an Alarm ID number used to define a parent.
- Action:** Correct the Parent Alarm ID number for the listed child.

Error locating group '*%s*'

- Cause:** The Alarm Logging task failed while reading CT files.
- Action:** Ensure the application is restored properly and converted (if necessary). Report the error to Customer Support.

Error on change read

- Cause:** The kernel returned an error when reading a message from a mailbox.
- Action:** Check the CT files or run `ctgen -r`.

Error reading *type* tag

- Cause:** The kernel returned an error while reading a tag.
- Action:** Check the CT files or run `ctgen -r`.

Error reading CT index

- Cause:** An error occurred while reading the CT index.
- Action:** Run `ctgen -r` and check the `al_log.ctg` file for corruption.

Error reading from CT *table* table

- Cause:** An error occurred on reading the CT record.
- Action:** Run `ctgen -r` and check the `al_log.ctg` file for corruption.

Error retrieving message from *type* mailbox

- Cause:** The kernel returned an error upon retrieving a message from a mailbox.
- Action:** Check the CT files or run `ctgen -r`.

LAN send Mailbox is not empty. Please check FLLAN.

Cause: The FLLAN task did not read messages from the mailbox.

Action: Check the Run-Time Manager screen to ensure that FLLANSND and FLLANRCV are running.

Limit tag has a different type at Unique Alarm ID *number*

Cause: Alarm tag and limit tag are different types.

Action: Correct the type of the alarm tag or limit tag. They must agree.

More *object* than configured!

Cause: More Alarms, Children, or Logbook entries exist than the number specified in the Distributed Alarm Logger Setup table.

Action: Increase maximum active alarms in general setup control for al_log.

No CT file found...

Cause: The al_log.ct file was not present.

Action: Check the tables for the domain selection and the ctlist file for typing errors.

No database information for logging...

Cause: Logging is requested for xxx group, but no setup information is entered.

Action: Fill out the Alarm Archive Control panel.

No Setup information specified

Cause: Parts of the Distributed Alarm Logger Setup table, which are necessary for startup to occur, are not configured.

Action: Complete the general setup.

Not enough memory

Cause: The software was not able to allocate sufficient memory to load all data into memory.

Action: You have insufficient memory in your system and must add more memory in order for the program to run.

- **DISTRIBUTED ALARM LOGGER**
- *Distributed Alarm Logging Messages*
-
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No valid printer device on 'Print Active List'

Cause: The software is not able to print the active alarm list because no valid device was entered in the Distributed Alarm Logger Setup table.

Action: Verify printer device is defined in printer spooler. Consult the printer troubleshooting manual if trouble persists.

Programming Error *number*. Contact Customer Support!

Cause: This error should not occur.

Action: Contact Customer Support and report the error code.

Received less bytes than expected

Cause: The FLLAN task is not able to transmit the entire message.

Action: Increase the MAXLEN parameter in the local group file.

Sequence error in receiving %s from node %d

Cause: The Alarm Logging task received an inappropriate message.

Action: Ensure the physical network connections are correct. Report the error to Customer Support.

Severe error: No memory available for *action*

Cause: The software is not able to allocate sufficient memory during run time.

Action: You have insufficient memory in your system and must add more in order for the program to run.

SQL Error *number*, '*message*'

Cause: Historian returned an error and message on an action from Distributed Alarm Logger.

Action: Refer to the Historian part on the error codes.

Timer task is not running!

Cause: The Timer task was not running before the Logging task was started. All internal time-stampings are retrieved from the Timer.

Action: Start the Timer task or, if it is already running, change the sequence to ensure the Timer starts before Alarm Logging.

Unable to insert DTP handler for %s tag

Cause: An internal tag processing call failed.

Action: Report the error to Customer Support.

Unable to open file for active list

Cause: The software is not able to open and write to the file called {FLAPP}/alarms.txt. It is possible the file already exists and is opened by another application or you have insufficient rights to open the file.

Action: May not have sufficient rights or enough disk space. Run a CHKDSK command to ensure enough disk space is available.

Unable to open Persistence file '%s'

Cause: The Alarm Logging task is unable to open the alarm persistence file to save data.

Action: Check the drive the application is on to ensure enough space is available. Ensure information can be written to the drive. If disk space is low, make space available.

Unable to restore Persistent Alarms

Cause: The Alarm Logging task is unable to open the alarm persistence file or its backup.

Action: Check the drive the application is on to ensure enough space is available. Ensure information can be written to the drive. If disk space is low, make space available.

Unable to write to Persistence file '%s'

Cause: The Alarm Logging task is unable to write record(s) to the opened alarm persistence file.

Action: Check the drive the application is on to ensure enough space is available. Ensure information can be written to the drive. If disk space is low, make space available.

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Warning: More than one line of *table* information

- Cause:** On tables where only one line is read, more lines are detected. The program will continue but could work on the wrong parameters.
- Action:** Remove the additional lines.

Alarm Viewer Messages

CT file *ctname* not found

- Cause:** The al_view.ct file was not present.
- Action:** Check the tables for the domain selection and the ctlist file for typing errors.

Dimensions of array too short, view window *number*

- Cause:** The array dimensions and the number of lines do not match. The array is too small.
- Action:** Correct the number of lines or redefine the array.

Duplicate Unique Alarm ID *number* used in CT file

- Cause:** The program detected a duplicate Alarm ID number in the software. This check is only performed when a -d or -l parameter is specified in the program arguments.
- Action:** Remove the duplicate Alarm ID.

Error clearing chg flag *type error*

- Cause:** The kernel returned an error while clearing a change flag.
- Action:** Check CT files or run ctgen -r.

Empty CT file table '*ctname*'

- Cause:** No tables are found in the CT file.
- Action:** Check Alarm Logging setup for table names.

Error *error* on change read

- Cause:** The kernel returned an error while reading a changed tag.
- Action:** Check CT files or run ctgen -r.

Error operation on *operation* mbx *number*

Cause: The kernel returned an error on a mailbox operation.

Action: Check the CT files or run `ctgen -r`.

Error reading CT index...

Cause: An error occurred on reading the CT index.

Action: Run `ctgen -r` and check the `al_view.ctg` file for corruption.

Error reading from CT file.

Cause: An error occurred on reading the CT record.

Action: Run `ctgen -r` and check the `al_view.ctg` file for corruption.

Error reading type *tag* error

Cause: The kernel returned an error while reading a tag.

Action: Check CT files or run `ctgen -r`.

Error writing type *tag* error

Cause: The kernel returned an error while writing a tag.

Action: Check CT files or run `ctgen -r`.

***Method data* for filtering does not exist**

Cause: The user-defined data does not match any of the available alarms or groups.

Action: You are trying to filter or sort a group that is not present. Adjust your sort method.

No Setup information specified

Cause: Parts of the Alarm Viewer table necessary to operate are not configured.

Action: Complete the parts of the Alarm Viewer table.

Not enough memory

Cause: The software is not able to allocate sufficient memory to load all data into memory.

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Action: Your system has insufficient memory to run the program. Add more memory.

Severe error, no memory available for *action*

Cause: The software is not able to allocate sufficient memory during run time.

Action: Add more memory.

Unable to load key file

Cause: One of the key files used for translation is missing.

Action: Reinstall FactoryLink.

Unknown alarm group *group*

Cause: The program is not able to find the Alarm ID number used to define a child.

Action: Check to see if your CT file is corrupted.

Unknown CT type...

Cause: An unknown type of CT in the CT file is displayed.

Action: Run `ctgen -r` and check the `al_view.ctg` and `al_info.ctg` files for corruption.

Warning: More than one line of *table* information

Cause: On tables where only one line is read, more lines are detected. The program will continue but could work on the wrong parameters.

Action: Remove the additional lines.

Wrong mailbox message type received *number*

Cause: This error should not occur.

Action: Contact Customer Support and report the error code.

Event and Interval Timer

Use the Event and Interval Timer task to define timed events and time intervals that initiate and control any system function in run-time mode.

- Timed events occur at a specific time not more than once every 24 hours (for example, Monday at 8:00 am). They are configured in the Event Timer Table.
- Time intervals occur at least once every twenty-four hours at regular intervals of the system clock (for example, every 60 seconds). They are configured in the Interval Timer Table.

The Event and Interval Timer task links timed events and intervals to real-time database elements used as triggers whenever the event or interval occurs. It is defined in the SHARED domain.

The use of Event and Interval timers requires an understanding of change-status flags. Refer to *FactoryLink Fundamentals* for this discussion.

There is no limit, except the amount of available memory, to the number of event and interval timers that can be defined.

Principles of Operation

The Event and Interval Timer task operates in synchronization with the system clock. For each defined interval or event, you must create a digital element in the real-time database. When the system clock matches the specified event or interval, the task forces the value of this digital element to 1 (ON).

The Event and Interval Timer task also updates global information used by FactoryLink such as the current time, the day of the week, and the month. Such global information is stored in predefined FactoryLink real-time database elements, known as reserved elements, each of which is one of the following data types: analog, long analog, or message.

While the Timer task is running, these reserved elements are constantly updated. In order for the Timer task to run, you must have entered an R flag for the Timer task in the System Configuration Table in the Configuration Manager Main

- **EVENT AND INTERVAL TIMER**
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Menu. The following table lists reserved elements that are updated by the Event and Interval Timer task.

Reserved Element	Data Type
A_SEC	Analog
A_MIN	Analog
A_HOUR	Analog
A_DAY (Day of month)	Analog
A_MONTH	Analog
A_YEAR	Analog
A_DOW (Day of week)	Analog
A_DOY (Day of year)	Analog
DATE (DOW MM-DD-YYYY)	Message
TIME (HH:MM:SS)	Message
DATETIME (DOW MM-DD-YYYY HH:MM:SS)	Message
YYMMDD (YY-MM-DD)	Message
SECDAY (Seconds since start of current day)	Long Analog
SECYEAR (Seconds since start of current year)	Long Analog
SECTIME (Seconds since January 1, 1980)	Long Analog

Changing the Operating System Date and Time

To change the operating system date and time while FactoryLink is running, shut down the Timer task, change the date and time, and restart the task. Otherwise, the Timer task tries to catch up by processing missed intervals.

EVENT TIMER INFORMATION PANEL

Perform the following steps to configure the Event Timer Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Event Timer in the Configuration Manager Main Menu to display the Event Timer Information panel.

Tag Name	Year	Mon.	Day	DOW	Hours	Mins.

- 3 Specify the following information for this panel:

Tag Name Element name (for example, time8am) assigned to the event. When the event occurs, the element is forced to 1 so its change-status bit is set to 1. The Timer task resets all event timers to zero at midnight. You can assign more than one element to the same event. You can also assign more than one event to a single element.

If the tag specified in this field is not already defined, a Tag Definition dialog is displayed when you click on Enter with a tag type of digital in the Type field. Accept this default.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital

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- *Event Timer Information Panel*

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Year, Mon., Day, DOW Period when an event is to occur. Enter a year (Year) month (Mon) day (Day) and day-of-the-week (DOW) or a combination. When using Day and Month, the event occurs only on this date in the specified month in the specified year.

If you do not enter a month, the event occurs on this date every month.

If you do not enter a month and year, the event occurs on this date every month of every year.

If you enter a month when using DOW, the event occurs on this day every week of that month only.

If you do not enter a month, the event occurs on this day every week.

If you enter a month and year, the event occurs on this day every week of the specified month during the specified year.

If you do not enter a month and year, the event occurs on this day every week of every year.

YEAR 4-digit year such as 1994.

MONTH 1-12 or MMM (Example: March is 3 or MAR for first three letters of the month's name.)

DAY 1-31 indicating the day the event is to occur. If the event is to occur once every day leave this field blank.

DOW MON - SUN First three letters of a weekday. If the event is to occur once every day, leave the field blank.

HOURS Refer to the discussion of Hours, Mins., and Secs.

MINS. Refer to the discussion of Hours, Mins., and Secs.

Hours, Mins., Secs. Specific time (in 24-hour format) when an event occurs. The event timer assumes a default value of zero (0) for blank fields. The conventions for use are

HOURS Hour the event is to occur (0 to 23).

MINS. Number of minutes (0 to 59) after the hour the event is to occur. Leave this field blank if the event is to occur on the hour.

SECS Number of seconds (0 to 59) after the minute (or hour) the event is to occur.

Between midnight (00:00:00) and the time indicated in the Hours, Mins., and Secs. fields, the value of the element to which an event is linked is 0 (OFF). After the timed event occurs, the element value changes to 1 (ON) and stays on until midnight when it changes back to 0 (OFF).

HOURS 0 - 23 (0 is midnight and 23 is 11:00 P.M.)

MINS 0 - 59

SECS 0 - 59

First Action taken upon system startup if startup occurs after a timed event. Because this field only affects events scheduled for the current date, the system checks the date before changing any values.

YES The element value changes immediately to 1 (ON) indicating the timed event are occurred for that date. The change-status flags are also set to 1 (ON).

NO Default—the element value is left as is and does not change to 1 (ON) until the next occurrence of the timed event.

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **EVENT AND INTERVAL TIMER**
- *Interval Timer Information Panel*
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INTERVAL TIMER INFORMATION PANEL

Perform the following steps to configure the Interval Timer Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Interval Timer in the Configuration Manager Main Menu to display the Interval Timer Information panel.

Tag Name	Hours	Mins.	Secs.	10ths

Buttons: Cancel, Enter, Exit

- 3 Specify the following information for this panel:

Tag Name

Name of the element (for example, sec5) assigned to the interval.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital

Hours Mins. Secs. 10ths

Interval an event is to occur at. If these fields are left blank, the interval timer assumes a default value of 0. At least one of these fields must be filled in with a valid entry (not zero, as it is not considered a valid entry) or the system prevents ITimer from starting, but instead displays the error message:

“Bad data in ITimer record (record#), file (itimer.exe).”

Depending on the interval you specify, the timer starts at midnight or at system startup. If the interval can be divided evenly into 24 hours (86,400 seconds or 1,440 minutes), the timer runs as if it started at midnight. If the interval cannot be evenly divided into 24 hours, the timer starts at system startup.

Conventions for use:

- HOURS** Number between 0 and 23 indicating the length, in hours, of the interval. Example: Every 2 hours (2), every 3 hours (3).
- MINS** Number between 0 and 60 that indicates the length, in minutes, of the interval. Example: Every 5 minutes (5), every 10 minutes (10).
- SECS** Number between 0 and 59 that indicates the length, in seconds, of the interval. Example: Every second (1), every 7 seconds (7).
- 10THS** Number between 0 and 9 that indicates the length, in tenths of a second, of the interval. Example: Every tenth of a second (1), every half second (5).

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

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- *Event and Interval Timer Messages*
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EVENT AND INTERVAL TIMER MESSAGES

One of the following messages is displayed to the right of **TIMER** on the Run-Time Manager screen if an error occurs in the Timer task at run time.

Bad data in ETIMER record *record_number*, file *filename*

Cause: The Event Timer Table contains one or more invalid values.

Action: Open the Event Timer Information panel. Ensure the correct element name is entered.

Check the data type. Only digital data types are valid on the Event Timer Information panel. Choose View>Object List to check the data type specified for an element. Then, use the Search function from the View menu or refer to RTDB Element List in *FactoryLink Fundamentals*.

Choose View>X-ref List to display the Cross Reference List to locate all panels that reference a particular element name. Choose View>Search, enter the desired element name, and click on Enter.

Bad data in ITIMER record *record_number*, file *filename*

Cause: The Interval Timer Table contains one or more invalid values.

Open the Interval Timer Information panel. Ensure the correct element name is entered.

Check the data type. Only digital data types are valid on the Interval Timer Information panel. Choose View>Object List to check the data type specified for an element. Choose View>Search or refer to RTDB Element List in *FactoryLink Fundamentals*.

Choose View>X-ref List to display the Cross Reference List to locate all panels that reference a particular element name. Choose View>Search, enter the desired element name, and click on Enter.

Bad filename index record in file *filename*

Cause: The **TIMER.CT** file may not have the correct number of configuration tables archived in it. One of the following files may

be damaged or missing:
FLAPP/ETIMER.MDX
FLAPP/ETIMER.CDB
FLAPP/ITIMER.MDX
FLAPP/ITIMER.CDB

Action: Ensure the following files exist:
FLAPP/ETIMER.MDX
FLAPP/ETIMER.CDB
FLAPP/ITIMER.MDX
FLAPP/ITIMER.CDB

Perform the following steps if the files are present and the problem still exists:

1. Delete FLAPP/TIMER.CT
2. Restart the application to rebuild the TIMER.CT file

Can't close file *filename*

Cause: Either the operating system, third-party software, or hardware setup on your system is incorrect or incompatible or an internal error occurred. The FactoryLink real-time database may have been corrupted.

Action: Verify the following:
The operating system is set up to run FactoryLink (tuning parameters, resources).

All third-party software needed by ,such as X-Windows, is installed and set up correctly and you have the correct version for FactoryLink.

All hardware is correctly set up and all of the hardware is compatible.

Contact Customer Support if everything is compatible and set up correctly but the error persists.

Can't find filename in file *filename*

Cause: The TIMER.CT file may not contain the correct number of configuration tables. One of the following files maybe damaged

- **EVENT AND INTERVAL TIMER**
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or missing:
 FLAPP/ETIMER.MDX
 FLAPP/ETIMER.CDB
 FLAPP/ITIMER.MDX
 FLAPP/ITIMER.CDB

Action: Ensure the following files exist:
 FLAPP/ETIMER.MDX
 FLAPP/ETIMER.CDB
 FLAPP/ITIMER.MDX
 FLAPP/ITIMER.CDB

Perform the following steps if the files are present and the problem still exists:

1. Delete FLAPP/TIMER.CT
2. Restart the application to rebuild the TIMER.CT file

Can't get FactoryLink ID errno *error_number*

Cause: The Timer task is unable to register with the FactoryLink kernel; the Timer task may already be running or more than 31 FactoryLink tasks not including Run-Time Manager may have been started.

Action: Check the Run-Time Manager screen to see if the Timer task is running. Also, check the number of tasks that have been started. The maximum number of tasks including Run-Time Manager is 32.

Can't open file *filename*

Cause: The specified file is either nonexistent or opened by another task. Incorrect editing may have caused the problem if the file is exported, edited with a text editor, and then imported.

Action: Ensure the specified file name exists. If it exists, check to see whether it was exported, edited with a text editor, and then imported. The file should be unformatted ASCII text.

Invalid tag type for Reserved Timer tag *element_name*

Cause: The specified reserved Timer element is the wrong data type. The RTDB may be damaged.

Action: Use the Configuration Manager Main Menu to correct the reserved timer element(s).

Read failed for ETIMER record *record_number* in file *filename*

Cause: An I/O error occurred during the reading of an Event Timer.CT record. The TIMER.CT file may not contain the correct number of configuration tables. One of the following files may be damaged or missing:
FLAPP/ETIMER.MDX
FLAPP/ETIMER.CDB

Action: Ensure the following files exist:
FLAPP/ETIMER.MDX
FLAPP/ETIMER.CDB

Perform the following steps if the files are present and the problem still exists:
Delete FLAPP/TIMER.CT.
Re-start the application to rebuild the TIMER.CT file.

Read failed for ITIMER record *record_number* in file *filename*

Cause: An I/O error occurred during the reading of an Event Timer.CT record. The TIMER.CT file may not have the correct number of configuration tables archived in it. One of the following files may be damaged or missing:
FLAPP/ETIMER.MDX
FLAPP/ETIMER.CDB

Action: Ensure the following files exist:
FLAPP/ETIMER.MDX
FLAPP/ETIMER.CDB

Perform the following steps if the files are present and the problem still exists:

1. Delete FLAPP/TIMER.CT
2. Restart the application to rebuild the TIMER.CT file

Reserved Timer tags not defined

Cause: Some or all of the reserved timer elements are not defined.

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- *Event and Interval Timer Messages*
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Action: The GLOBAL.CDB and/or GLOBAL.MDX files are damaged.

FLNEW did not run. FLNEW creates a blank application structure, including these two files.

Part of FLINK/BLANK may be missing.

Wrong Kernel version

Cause: Incompatible versions of FactoryLink software exist on the system.

Action: Reinstall the system.

Wrong number of CTs archived in file *filename*

Cause: The TIMER.CT file may not contain the correct number of configuration tables. One of the following files may be damaged or missing:

FLAPP/ETIMER.MDX
 FLAPP/ETIMER.CDB
 FLAPP/ITIMER.MDX
 FLAPP/ITIMER.CDB

Action: Ensure the following files exist:

FLAPP/ETIMER.MDX
 FLAPP/ETIMER.CDB
 FLAPP/ITIMER.MDX
 FLAPP/ITIMER.CDB

Perform the following steps if the files are present and the problem still exists:

1. Delete FLAPP/TIMER.CT
2. Re-start the application to rebuild the TIMER.CT file

File Manager

The FactoryLink File Manager task can be used to perform basic operating system file-management operations initiated by a FactoryLink application at run time. The task can work in conjunction with FactoryLink's FLLAN option to initiate operations within other FactoryLink stations on a network. The File Manager initiates the following operations:

- Copy a file
- Rename a file
- Delete a file
- Print a file
- Display a directory
- Type a file

File Manager initiates these operations with six commands:

- COPY
- REN
- DEL
- PRINT
- DIR
- TYPE

These commands perform the same functions as their operating system counterparts. The File Manager controls all file operations through the FactoryLink real-time database.

You can configure other FactoryLink tasks to initiate File Manager operations. For example,

- You can configure input functions in Graphics so an operator can use them to initiate file-management operations at run time, such as to display a list of recipes or reports.
- The Timer task can trigger File Manager to automatically back up files to a networked server at certain intervals, such as each day at midnight.

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- The Timer task can also trigger File Manager to delete log files automatically at certain intervals, such as once every four hours, or after certain events, such as when log files reach a specified size.
- Alarm Supervisor can trigger File Manager to print alarm files.

FILE MANAGER PARAMETERS

Put the following parameter in the Program Arguments column of the System Configuration Information panel in FLCM:

-a<x> Where <x> is the ACK timeout in seconds

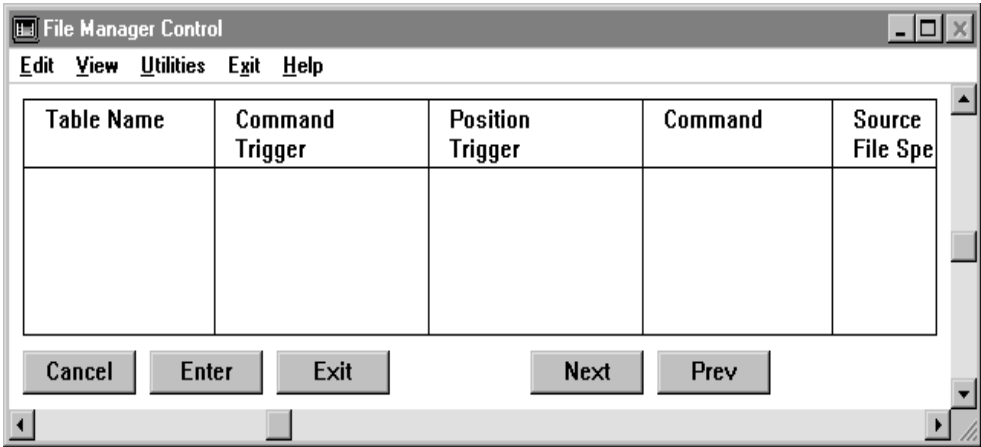
Each request is acknowledged. File Manager will wait a default of 15 seconds for the ACK. Use this parameter if you wish to change this timeout.

- **FILE MANAGER**
- *File Manager Control Panel*
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FILE MANAGER CONTROL PANEL

Perform the following steps to configure the File Manager Control panel:

- 1 Ensure the domain selected is correct in the Configuration Manager Domain Selection box.
- 2 Choose File Manager in the Configuration Manager Main Menu to display the File Manager Control panel.



- 3 Specify the following information for this panel:

Field Name

(Required for TYPE and DIR operations) Alphanumeric string of 1 to 16 characters that specifies the name of the operation being defined or modified. For TYPE and DIR operations, this field connects the entry in the File Manager Control panel with the associated File Manager Information panel for that entry.

This field is optional for COPY, REN, DEL, and PRINT operations. Use it to distinguish different operations of the same type.

Valid Entry: alphanumeric string of 1 to 16 characters

Command Trigger

Name of an element used to initiate the file operation.

Valid Entry: standard tag name

Valid Data Type: digital, analog, longana, float, message

Position Trigger	<p>Required only for DIR and TYPE operations; not used for COPY, PRINT, REN, and DEL operations. Name of an element whose value tells the File Manager where in a directory to start listing files or where in a file to start typing.</p> <p>The File Manager starts reading after the line number specified by the value of the Position Trigger element. For example, if the value of the Position Trigger element is 6, the File Manager begins reading the file at line seven. The number of lines displayed or the number of files listed depends on the number of Tag Name elements defined in the File Manager Information panel.</p> <p>You can configure the system so, at run time, you or any FactoryLink task can change the value of this element so the File Manager starts at a different point in a directory or file and shows a different subset of information.</p> <p>Do not specify the same element name for DIR and TYPE operations.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog</p>
Command	<p>File operation to be performed. This can be one of the following:</p> <p>COPY Copies the source file to the destination file. Specify both the source and destination paths. This operation does not require you to complete a File Manager Information panel.</p> <p>REN Renames the source file to the destination file. Specify both the source and destination paths. Both the source and destination paths must be the same; that is, they must point to the same directory. This operation does not require you to complete a File Manager Information panel.</p> <p>DEL Deletes the source file. The DEL command requires only the source path; the destination path is ignored. This operation does not require you to complete a File Manager Information panel.</p> <p>PRINT Causes the file specified by the source path to be printed on the device specified by the destination path. The destination path must contain the name of a device known to the Print Spooler task. This operation works only with the Print Spooler and</p>

- **FILE MANAGER**
- *File Manager Control Panel*
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does not require you to complete a File Manager Information panel.

DIR Displays a list of all files in the directory specified by the source path, which can include wildcard characters. The destination path is ignored. This operation requires you complete a File Manager Information panel and define output text objects in Application Editor to display lines from the file.

TYPE Displays the contents of the source file. The destination path is ignored. This operation requires you complete a File Manager Information panel and define output text objects in Application Editor to display lines from the file. Note that File Manager reads only 80 characters at a time and puts the rest of the line (if more than 80 characters) into the next message tag. For example, if the message in the line is 140 characters long, it puts the first 80 into the first message tag and the next 60 into the second message tag.

Source File
Spec.

Full path name of the source file. The Source File Spec. can use the filename syntax for the operating system either the remote or the local station resides on. If you are using FLLAN, the source can reference a remote station.

If you specify a remote station for the destination and a remote station for the source, the two remote stations must be the same. If the destination is local, the source station has no restriction. Similarly, if the source is local, the destination has no restriction.

Type wildcard characters in the path name to show a root directory's contents using the **DIR** command. For example, in this field type:

`C:*.*`

Only one file in a copy operation can be remote. Both files in a rename operation must be on the same station.

For stand alone systems:

`/DEVICE_NAME/DIR_NAME/SUB_DIR_NAME/FILE_NAME`

For networked systems:

\\STATION_NAME\DEVICE_NAME\DIR_NAME\SUB_DIR_NAME\FILE_NAME

In the case of the COPY, DEL, and DIR commands, the Source File Spec. may contain variable specifiers or wildcard characters.

Source
Variables 1-4

Names of elements whose values replace the variable specifiers in the source path name. These fields work in conjunction with the Source File Spec. field to form the path of the file the File Manager performs operations to. The value of the element in the Source Variable 1 field replaces the first variable specifier, the value of the element in the Source Variable 2 field replaces the second variable specifier, and so on.

If using variable specifiers, make the data type of the element match the variable specifier type.

Valid Entry: standard tag name

Valid Data Type: digital, analog, longana, float, message

Destination File
Spec.

Full path name of the destination file that uses the filename syntax for the operating system either the remote or the local station resides on. The destination can reference a remote station if you are using FLLAN.

If you specify a remote station for the destination and a remote station for the source, the two remote stations must be the same. If the destination is local, the source station has no restriction. Similarly, if the source is local, the destination has no restriction.

For stand-alone systems:

/DEVICE_NAME/DIR_NAME/SUB_DIR_NAME/FILE_NAME

For networked systems:

\\STATION_NAME\DEVICE_NAME\DIR_NAME\SUB_DIR_NAME\FILE_NAME

Unless you use wildcard characters in the Source File Spec., specify the full path name of the destination. If you use wildcard characters, do not specify the full path; specify only the directory. In the case of the COPY, DEL, and DIR commands, the destination file specification can contain variable specifiers or wildcard characters.

Use the following destination file specification format if using the PRINT command:

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[\\station_name\] [flags] [spool_device]

where

- station_name Is the optional FactoryLink station name (defaults to LOCAL). The FactoryLink station name is not used on stand alone systems.
- flags Are the optional flags. This can be one of the following:
 NONE—Default.
 B—Binary file
 S—Suppress beginning and end of file. Used to concatenate files
- spool_device Is the optional spool device (defaults to 1; legal devices are 1 through 5).

Destination Variables 1-4

Names of elements whose values replace the variable specifiers in the destination path name. These fields work in conjunction with the Destination Format field to form the path of the file the File Manager performs operations to. The value of the element in the Destination Variable 1 field replaces the first variable specifier, the value of the element in the Destination Variable 2 field replaces the second variable specifier, and so on.

Make the data type match the variable specifier type if you use variable specifiers.

Valid Entry: standard tag name
Valid Data Type: digital, analog, longana, float, message

Completion Trigger

Name of an element used to indicate that a file management operation is complete. This element, if entered, is set by File Manager and can be referenced by any FactoryLink task (including File Manager) to monitor file management operations or trigger an event.

Valid Entry: standard tag name
Valid Data Type: digital

Completion Status

Name of an element set by the File Manager task to indicate the status of an operation. The Completion Status element can be referenced by any FactoryLink task (including the File Manager) to handle file error situations or trigger the next File Manager table to start an operation.

The File Manager writes an analog value to the Completion Status element to indicate the status of a file management operation. This element can have any of the following status values.

Value	Description	Value	Description
0	Operation completed successfully.	12	File could not be opened.
1	Current operation in progress.	13	Error occurred while reading a file.
2	Specified file(s) not found.	14	File could not be created.
* 3	Requested a line beyond end of file.	15	Error occurred while writing to a file.
5	Remote system could not perform requested action.	16	Illegal spool device is specified.
6	Attempt to log onto a remote station failed.	17	Not enough memory to perform operation.
8	Network transmission error occurred.	97	Illegal filename is specified.
* If you increase the TYPE/DIR position trigger offset values beyond the end of the file, the File Manager reads in as many lines as possible, sets the completion trigger, and sets the completion status to 3.			

Valid Entry: standard tag name

Valid Data Type: analog

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **FILE MANAGER**
- *File Manager Information Panel*
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FILE MANAGER INFORMATION PANEL

Perform the following steps to configure the File Manager Information panel:

- 1 Ensure the domain selected is correct in the Configuration Manager Domain Selection box.
- 2 Choose File Manager in the Configuration Manager Main Menu to display the File Manager Information panel.

Tag Name

Table Name

- 3 Specify the following information for this panel:

Tag Name (Required only for DIR and TYPE operations; not used with COPY, PRINT, REN, and DEL operations.) Name of a message element that, as a result of a DIR or TYPE command, receives a message value to be displayed in a single line on a graphics screen. The number of Tag Name fields defined in this panel determines the number of lines displayed as a result of a DIR or TYPE command at run time.

Values are written to the elements defined in the Tag Name field whenever a DIR or TYPE operation is triggered or whenever the operator changes the value of the Position Trigger element defined in the File Manager Control panel. A different value in the Position Trigger element means information from a different place in the directory or file is displayed.

Valid Entry: **standard tag name**

Valid Data Type: **message**

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **FILE MANAGER**
- *File Manager Messages*
-
-

FILE MANAGER MESSAGES

The following error messages may be displayed next to FLFM on the Run-Time Manager screen:

Can't determine domain name

Cause: No domain is specified.

Action: Specify a domain. See *FactoryLink Fundamentals* for information about specifying a domain.

Can't determine fluser name

Cause: No FLUSER name is specified.

Action: Specify an FLUSER name. Refer to the *FactoryLink Fundamentals* manual for information about specifying an FLUSER.

Can't find Network

Cause: Either the network shut down or is not installed correctly.

Action: Restart the network if it shut down. Reinstall it if installed incorrectly.

Cause: The wrong name is entered in the LOCAL file.

Action: Enter the name the network is registered under in the LOCAL file.

Cause: The ETC services file may not have any entries if using a TCP/IP network.

Action: Refer to Chapter 119, "FLLAN" in this manual for information about adding the correct entries to the ETC services file.

Can't add local name to the network

Cause: Either the name specified in the LAN Local Names panel is not a valid network name or the network software may not have been installed properly.

Action: Choose Local Area Network Groups on the Configuration Manager Main Menu. Modify the local names on the LAN Local Names panel. Ensure the network software is operating properly if this does not correct the error.

Can't determine local node name

Cause: Either the LAN local names file (FLAPP/NET/LOCAL) does not exist or it contains invalid data.

Action: Ensure FLAPP/NET/LOCAL exists. Create it if it does not exist. If it exists, find and correct any invalid data.

Can't open file *filename*

Cause: The specified file may not exist or another task may have opened it.

Action: Ensure the specified file exists. Create it if it does not exist.

**Can't send ACK to inform client I'm ready
Received error or hangup during connect
New client communications setup failed**

Cause: The client or network may not be operating.

Action: Check state of client and network connection.

Error creating temp file; check SPOOL dir

Cause: The hard disk is full.

Action: Delete any unnecessary files.

Cause: The /SPOOL directory was not created during installation.

Action: Create a /SPOOL directory or reinstall FactoryLink.

Cause: The /SPOOL directory was deleted.

Action: Create a /SPOOL directory or reinstall FactoryLink.

Cause: The permissions are corrupt.

Action: Change the permissions so the FactoryLink user name is authorized to create files in the /SPOOL directory.

- **FILE MANAGER**
- *File Manager Messages*
-
-

Error opening CT

- Cause:** The /FLINK/CT/FLFM.CT file does not exist, may not be opened, or may be damaged. The installation may not have completed successfully.
- Action:** Ensure the /FLINK/CT/FLFM.CT file exists. If the file does exist, delete /FLINK/CT/FLFM.CT and restart the application to rebuild the FLFM.CT file.

Error opening *filename*

- Cause:** The file does not exist.
- Action:** Specify a different file or create the file.
- Cause:** A syntax error occurred when specifying the path or filename.
- Action:** Retry the command using the correct path and filename.
- Cause:** The File Manager task does not have permission to read the specified file.
- Action:** Change the permissions so the FactoryLink user name is authorized to open files in the specified directory.

Error printing file

- Cause:** Either the printer is disconnected, is not powered on, is not online, or has some other problem.
- Action:** Ensure the printer cables are connected, the power is on, and the printer is online. Contact the system administrator for the printer in use if the file still does not print.

Error reading CT index

- Cause:** The /FLINK/CT/FLFM.CT file is damaged.
- Action:** Delete /FLINK/CT/FLFM.CT. Restart the application to rebuild the FLFM.CT file.

File Manager task init. failed, err = *number*

- Cause:** The File Manager task could not register with the FactoryLink kernel.
- Action:** Choose System Configuration from the Configuration Manager Main Menu. Ensure the System Configuration Table contains the entry FLFM. Also, ensure the File Manager option is enabled on the FactoryLink key.

File Manager option bit not set

- Cause:** The option bit for the File Manager task is not enabled on the FactoryLink key. Either you entered the configuration sequence incorrectly during installation or you have not purchased the File Manager option.
- Action:** First, check the license material on the Exhibit A form that accompanies the FactoryLink package to see if File Manager is listed as a licensed option. If it is listed on the Exhibit A form, reenter the configuration sequence and authorization code to enable the option. Refer to the *Windows NT and Windows 95 Installation Guide* for information about the configuration sequence and authorization code.

If File Manager is not listed on the Exhibit A form, contact your FactoryLink sales representative to purchase the File Manager option.

File not found

- Cause:** The file does not exist.
- Action:** Specify a different file.
- Cause:** A syntax error occurred when specifying the path or filename.
- Action:** Retry the command using the correct path and filename.
- Cause:** The File Manager task does not have permission to print the specified file.
- Action:** Change the permissions so the FactoryLink user name is authorized to print files in the specified directory.

- **FILE MANAGER**
- *File Manager Messages*
-
-

File read ERROR on *filename*

Cause: The disk may be corrupt.

Action: For Windows and OS/2, run the disk diagnostic program CHKDSK to determine if the disk is corrupt. If the disk is corrupt, recreate the file from scratch or from the backup disk or tape.

For UNIX, run the disk diagnostic and repair program fsck to determine if the disk is corrupt. If the disk is corrupt, fsck can repair the disk as it prompts you for information.

If the corruption is not on the root drive, inform your system administrator of the corruption as fsck will not be able to repair it.

File write ERROR on *filename*

Cause: The disk may be full.

Action: Delete any unnecessary files. Add disk space if this error occurs frequently.

FLFM port in use-do file operation later

Cause: If the File Manager server gets this error, another server may already be up on that machine. If the File Manager client gets this error, then too many clients may be running on that machine. (The current limit is 10.)

Action: Check for existing File Manager server or clients. Try the file operation again later.

Internal request queue is corrupt

Cause: An internal FLFM error occurred.

Action: Contact Customer Support.

Invalid character in PRINT destination

Cause: An invalid character is entered after the node name in the Destination Format field of the File Manager Control panel.

Action: Open the File Manager Control panel. Specify a valid entry in the Destination Format field.

Invalid command

Cause: An invalid command is entered in the Command field of the File Manager Control panel.

Action: Open the File Manager Control panel. Specify a valid command in the Command field:

COPY
DEL
DIR
PRINT
REN
TYPE

Invalid CT file

Cause: The /FLINK/CT/FLFM.CT file is damaged.

Action: Delete /FLINK/CT/FLFM.CT. Restart the application to rebuild the FLFM.CT file.

Invalid local name file

Cause: An invalid character or parameter is entered in the LOCAL field.

Action: Choose Local Area Network Groups from the Configuration Manager Main Menu. Ensure all information defined on the LAN Local Names panel is valid. Correct invalid information. Refer to Chapter 119, "FLLAN," in this book for information about the correct syntax for this file.

Local wild-card copy failed on *filename*

Cause: Not enough RAM to build the file list.

Action: Shut down unnecessary tasks. Add RAM if this error occurs often.

Network open did not connect

Cause: The session is not properly connected.

Action: Retry the operation.

- **FILE MANAGER**
- *File Manager Messages*
-
-

Network open failed *network name*

Cause: Either no available sessions exist or the node name is not valid.

Action: Ensure the remote node name (part of the file path name) is valid and retry the operation.

Network open timeout

Cause: The network may be down.

The node may be down.

The node name in the file path name may be invalid.

Action: Ensure the node name is valid and the node and network are up and running.

Network write error

Cause: The system cannot write to the network because the remote program shut down or terminated communications.

Action: Ensure the remote node is up and connected.

Never got ACK from server-giving up Received no ACK or BUSY msg from server

Cause: Server or network may be down or may have gone down.

Action: Check state of server and network connection.

No network for receive

Cause: You have specified a remote node name for a File Manager operation; however, the FactoryLink system does not contain the FLLAN option. File Manager operations cannot be performed to remote nodes unless the FLLAN option is installed.

Action: Specify a local node or install the FLLAN option.

No network for send

- Cause:** You have specified a remote node name for a File Manager operation; however, the FactoryLink system does not contain the FLLAN option. File Manager operations cannot be performed to remote nodes unless the FLLAN option is installed.
- Action:** Specify a local node or install the FLLAN option.

No tables configured for this task

- Cause:** No File Manager configuration tables have been defined.
- Action:** Open the Configuration Manager Main Menu and choose File Manager. Specify information in the File Manager's configuration tables.

Out of RAM

- Cause:** Not enough memory to run this task.
- Action:** Restart the task. If it fails again, allocate more memory for this task or allocate more virtual memory.

Partial wild-card copy *filename*

- Cause:** An error occurred during a multi-file copy. The File Manager copied all files in the list prior to the specified file. The File Manager did not copy the specified file and any files after it on the list.
- Action:** Copy the files that were not copied or retry the operation.

Received error or hangup during connect

See "Can't send ACK to inform client I'm ready."

Received no ACK or BUSY msg from server

See "Never got ACK from server-giving up."

Remote wild-card copy failed

- Cause:** Not enough RAM exists to build the file list.
- Action:** Shut down unnecessary tasks. Add virtual memory if this error occurs often.

- **FILE MANAGER**
- *File Manager Messages*
-
-

Request to allocate zero size RAM block

Cause: Either the operating system, third-party software, or hardware setup on your system is incorrect or incompatible or an internal error occurred.

Action: Verify the following:

The operating system is set up to run FactoryLink (tuning parameters, resources)

All third-party software needed by FactoryLink, such as X-Windows, is installed and set up correctly and you have the correct version for FactoryLink.

All hardware is correctly set up and all of the hardware is compatible.

Server busy-waiting for ACK from server

Cause: The server is currently servicing another client's request.

Action: No action is needed. The server will automatically serve the request when it is freed up.

Two different remote nodes, *node name node name*

Cause: A different remote name is entered in the Source Format field than was entered in the Destination Format field of the File Manager Control panel for the `PRINT` command. A remote name must be the same in both fields.

Action: Open the File Manager Control panel. Ensure both names are the same if remote names are specified in both the Source Format and Destination Format fields.

Unknown configuration option

Cause: An invalid parameter or character is entered in the LAN local names file (`/FLAPP/NET/LOCAL`).

Action: Choose Local Area Network Groups from the Configuration Manager Main Menu. Ensure a valid local name is defined on the *LAN* Local Names panel. Enter the correct information. Refer to the "Local Area Networking" section in this manual for information about correct LOCAL file syntax.

- **FILE MANAGER**
- *File Manager Messages*
-
-

FLLAN

The FactoryLink Local Area Networking (FLLAN) module transmits FactoryLink data between computers (called stations) across a network. A network is a combination of hardware and software that lets multiple computers share resources, such as files, printers, or data. A network consists of the following parts.:

A Network Operating System (NOS)—Software that transports data between software applications on different computers.

- **A network application**—Software that sends data to a similar application on another computer via the Network Operating System.
- **The network hardware**—Network interface cards installed on each computer on the network and cables that link them all together.

Sending and Receiving Data

Sending Values to Remote Stations

FLLAN uses send operations to send data to remote stations. During a send operation, the FLLAN on the local station sends values from the FactoryLink real-time database across the network to the FLLAN on the remote station. The FLLAN on the remote station writes these values to the real-time database on the receiving station.

Receiving Values from Remote Stations

During a receive operation, FLLAN receives values from a remote station and stores them in the FactoryLink real-time database as elements. You do not need the module FLLAN on two or more FactoryLink stations in order to share and store files on a network server or use network printers. External networking software allowing peer services is sufficient to achieve this goal.

Local and Remote Stations

Each station on the network must have a unique station name so FLLAN can identify it. Each station views itself as the local station and views all other stations on the network as remote.

- **FLLAN**
-
-
-

Network Groups

You can combine one or more stations into groups. Grouping permits you to transmit the same data to multiple stations with a single operation. A single station can belong to more than one group. You can use the same group name on more than one remote station; however, these groups are independent and do not correspond to each other.

Using Multiple Platforms on a Network

Because the Network Operating System is transparent to FactoryLink, you can use a different Network Operating System program on each station on a network. This lets you use FactoryLink for different platforms within the same network. For example, the following illustration shows a network of four stations, each running FactoryLink on a different platform. You must use the same protocol on all stations in the network.

Monitoring the Network

You can monitor the status of remote stations on the network, such as the number of transmissions the remote station has sent and received and whether these transmissions were successful. You can view the status at run time and other FactoryLink modules can use this information for other activities.

Local Station's Default Values

The local station name and the default values FLLAN uses to transmit data is stored in the local name file FLAPP/net/local on each FactoryLink station. We recommend you consult your network administrator if you need to change the default values.

Ordering Tag Names

When sending element values, FLLAN groups the elements by data type and sends them in the following order: digital, analog, floating-point, message, long analog, and mailbox. These groups are called packets. To maximize efficiency, place tags of like data-types next to each other in the LAN Send Information panel and order them by digital, analog, floating-point, message, long analog, and mailbox.

LOCAL AREA NETWORK GROUPS TABLE

FactoryLink must know the name of each local and remote station on the network running a FactoryLink application as well as any groups defined for the station. This information is defined in the Local Area Network Groups Configuration table which consists of two panels:

- LAN Local Names panel—Defines local station name and any changes to station default values. Field descriptions for this panel are provided in the “LAN Local Names Panel” on page 192.
- LAN Remote Names panel—Defines the network groups and station. Field descriptions for this panel are provided in the “LAN Remote Names Panel” on page 193.

You can fill out as many Send tables as the RAM on your system allows.

You can enter as many elements as the available RAM allows.

The Local Area Network Send table is filled out in the SHARED domain.

- **FLLAN**
- *LAN Local Names Panel*
-
-

LAN LOCAL NAMES PANEL

Local station names are defined in the LAN Local Names panel. Define names for each computer in the network running FactoryLink.



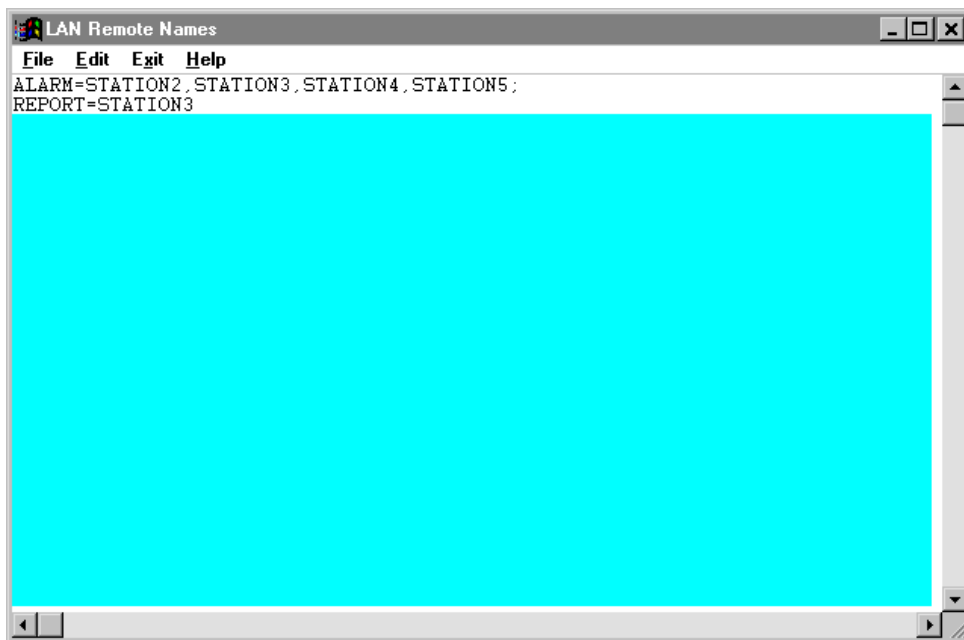
When you fill out the LAN Local Names panel, the Configuration Manager does not validate the syntax of the local name you enter.

- 1 Alphanumeric name to reference the local station. Use the name you assigned to this station when you installed the network operating system.
- 2 Parameter names and new values beneath the station name if you want to change the default local station values. Refer to the *Configuration Guide* for a list of possible parameters.

We recommend you consult your network administrator before changing the default values.

LAN REMOTE NAMES PANEL

Network groups are defined in the LAN Remote Names panel. You must assign each remote station on the network to a network group. Do not include the name of the local station in a network group. Define network groups for each computer in the network running FactoryLink.



- 1 All group names using the following format, each entered on a separate line.

```
group = STATION[, STATION...];
```

where

- | | |
|---------|---|
| group | Alphanumeric name of 1 to 16 characters assigned to a network group. Group names can be either upper or lowercase. |
| STATION | Name of one or more remote stations to include in the group. This name should match the name you assigned to the station when you installed the network protocol. |

- **FLLAN**
- *LAN Remote Names Panel*
-
-

Separate each name with a comma. The station list can be split at the end of the line, but the comma must be displayed on the same line as the station name. Station names must be uppercase. Place a semicolon (;) at the end of a group name definition.

LOCAL AREA NETWORK SEND TABLE

Data is sent from one station to another using send operations. Each send operation defines what data to send when the operation executes. The operations and the data to send with each operation are defined in the Local Area Network Send configuration table. This table has two panels:

- LAN Send Control panel—Defines the stations to receive data and the conditions FLLAN sends the data under. Refer to the “LAN Send Control Panel” on page 196 for details.
- LAN Send Information panel—Defines the elements sent to the remote stations with the send operation. Refer to the “LAN Send Information Panel” on page 200 for details.

You can fill out as many Send tables as the RAM on your system allows.

You can enter as many elements as the available RAM will allow.

The Local Area Network Send table is filled out in the SHARED domain.

- **FLLAN**
- *LAN Send Control Panel*
-
-

LAN SEND CONTROL PANEL

Perform the following steps to configure the LAN Send Control panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Local Area Network Send in the Configuration Manager Main Menu to display the LAN Send Control panel.

Table Name	Group Name	Block Trigger	Block Send Flag	E: S
DALOGLAN	ALARM		N	Y

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:

Table Name Alphanumeric name of 1 to 16 characters to reference the send operation.

Valid Entry: alphanumeric name of 1 to 16 characters

Group Name Alphanumeric name of 1 to 16 characters that identifies the group of network stations FLLAN sends the element values to. This name must match a name defined in the LAN Remote Names panel.

Enter ALL if you want to send the data to all stations named in the GROUPS file.

Valid Entry: alphanumeric name of 1 to 16 characters

Block Trigger Name of a tag that triggers this operation. When the change-status flag for this task is set, FLLAN sends the values specified in the LAN Send Information panel to the stations

included in the group specified in the Group Name field of this panel. If you leave this field blank, activate the send operation with the Exception Send Flag field.

You can specify both a trigger in this field and an exception send in the Exception Send Flag field on this panel. The operation executes each time the trigger is set and each time the tag value changes; however, if you do this the value may not always be sent on exception because the block trigger may reset the change status bit before FLLAN processes the Exception Send table.

The tag specified must be in the SHARED domain.

To send the table only when this tag value is forced to 1 (on), define this tag as digital.

To send this table whenever this tag value changes, define this tag as analog, longana, float, message, or mailbox.

To send individual values only as the table tag values change, rather than as a triggered block send, leave this field blank.

You must define the Block Send field if you define this field.

Valid Entry: standard tag name

Valid Data Type: digital, analog, longana, float, message, mailbox

- **FLLAN**
- *LAN Send Control Panel*
-
-

Block Send Flag Specifies the values sent when this operation is triggered. This can be one of the following:

- W** Writes only the values that have changed since the last send.
- YES** Force-writes only the values that have changed since the last send. If you enter YES, FLLAN does not send a tag default value at start up. Instead, FLLAN waits to send it until the tag value changes to something other than the default.
- NO** Sends all values except empty mailboxes whether or not they have changed.

You must define a Block Trigger for the Block Send Flag to work.

Exception Send Flag Indicates whether or not to send values of individual elements as they change. This can be one of the following values:

- W** Writes values that change when they change.
- YES** Force-writes values that change when they change. If you enter YES, FLLAN does not send a tag default value at start up. Instead, FLLAN waits to send it until the tag's value changes to something other than the default.
- NO** Does not send values when they change. If you enter NO, activate the send operation with the Block Trigger field. This is the default.

You minimize network traffic if you send only the values that change.

You can specify both a trigger in the Block Trigger field and an exception send in this field for the same operation. The operation executes each time the trigger is set and sends the individual elements each time an element value changes.

If you set up FLLAN to send the data as it changes and the change bit for the data is set before FLLAN establishes communication with the remote node, FLLAN will not send the data until the next time the data changes. To ensure FLLAN sends the changed data, define a Send State tag in the Network Monitor table. Refer to the *Configuration Guide* for more information and define a Math & Logic procedure to monitor the value of the Send State tag.

Do not use the same element in more than one Exception table if you specify exception sends. If you have the same tag in a Block Send table and an Exception Send table, the triggered table may reset the change status bit before the Exception Send table is processed with the result that the value/tag is not sent on exception.

Enable/ Disable Tag	Name of a digital tag used to disable this operation. When the value of this tag is set to 0, this operation is not executed, even when the Block Trigger is set. This field disables the operation for all stations included in the group.
------------------------	---

This element is useful if a remote station is not available for the network for a long period of time.

Valid Entry: standard tag name (default = 1)

Valid Data Type: digital

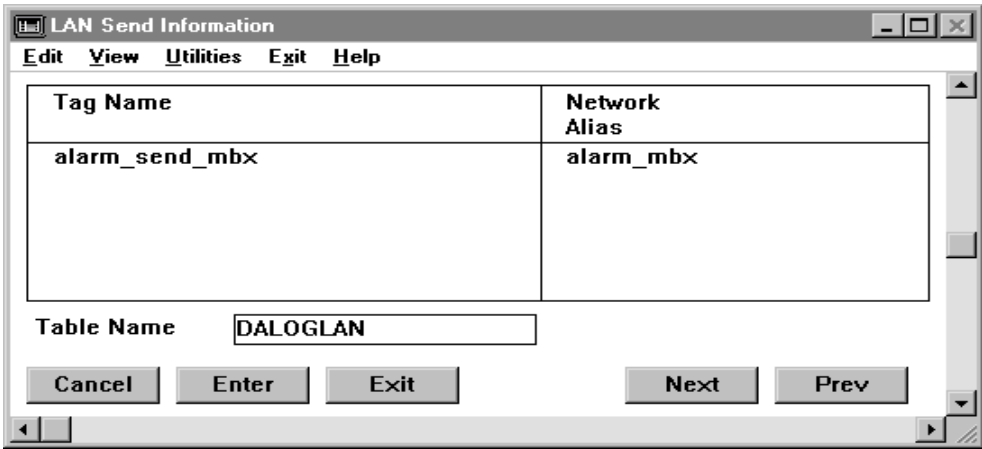
- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **FLLAN**
- *LAN Send Information Panel*
-
-

LAN SEND INFORMATION PANEL

Perform the following steps to configure the LAN Send Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Local Area Network Send in the Configuration Manager Main Menu to display the LAN Send Information panel.



- 3 Specify the following information for this panel:

Tag Name

Tag name that references the real-time database element to send with this operation.

 The tag specified must be in the SHARED domain.

 If you enter message or mailbox tags, ensure the MAXLEN value is set to slightly larger than the longest message or mailbox value. If the MAXLEN value is set lower than the length of a message or mailbox value, the value is truncated. Refer to the *Configuration Guide* for more information.

 Valid Entry: standard tag name
 Valid Data Type: digital, analog, longana, float, message, mailbox

Network Alias

Alphanumeric alias name of 1 to 48 characters. Do not use a number for the first character. This is the name FLLAN uses to transfer data on the network.

The alias name is a tag name used globally by all stations on the network. It identifies data sent from one station to another. Define this name on the sending station and reference it on all remote stations receiving data from the sending station.

If you use an alias name, you can be more flexible when naming elements among systems. For instance, at one station an analog element may be called `alm7` while at another station an analog element containing the same data may be called `temphigh`. To transfer data across the network from `alm7` to `temphigh`, you can designate an alias name, such as `hot`, for that data.

If you leave this field blank, FLLAN uses the name in the Tag Name field as the network alias; therefore, ensure the first 16 characters of each name in the Tag Name field are unique.

Valid Entry: alphanumeric alias name of 1 to 48 characters

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **FLLAN**
- *Local Area Network Receive Table*
-
-

LOCAL AREA NETWORK RECEIVE TABLE

FLLAN can receive data from elements on remote FactoryLink stations and write them to the real-time database on the local station. This mapping is defined in the Local Area Network Receive configuration table. This table has two panels.

- **LAN Receive Control panel**—Defines the remote stations that can send data to the local station. Refer to “LAN Receive Control Panel” on page 203 for details.
- **LAN Receive Information panel**—Defines the elements in the local real-time database that are updated by data received from remote stations. Unless you list an element's name in this table, another station cannot change its value. This provides security for sensitive data. Refer to “LAN Receive Information Panel” on page 204 for details.

You can configure as many Receive tables as the RAM on your system allows.

You can enter as many elements as the available RAM allows.

The Local Area Network Receive table is configured in the SHARED domain.

LAN RECEIVE CONTROL PANEL

Perform the following steps to configure the LAN Receive Control panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Local Area Network Receive in the Configuration Manager Main Menu to display the LAN Receive Control panel.

Table Name	Group Name	
REPORTDATA	REPORT	

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:

Table Name Alphanumeric name of 1 to 16 characters for this receive operation.

Valid Entry: alphanumeric name of 1 to 16 characters

Group Name Alphanumeric name of 1 to 16 characters that identifies the group of network stations FLLAN receives the element values from. This name must match a name defined in the LAN Remote Names panel.

Valid Entry: alphanumeric name of 1 to 16 characters

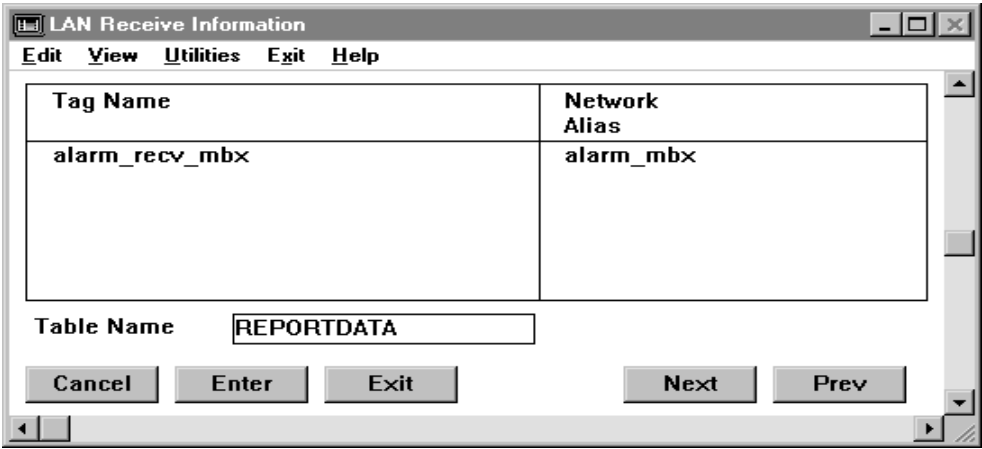
- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **FLLAN**
- *LAN Receive Information Panel*
-
-

LAN RECEIVE INFORMATION PANEL

Perform the following steps to configure the LAN Receive Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Local Area Network Receive in the Configuration Manager Main Menu to display the LAN Receive Information panel.



- 3 Specify the following information for this panel:

Tag Name

Tag name of the database element to be updated when the data identified by network alias is received.

 The tag specified must be in the SHARED domain.

 If you enter message or mailbox tags, ensure the MAXLEN value is set to slightly larger than the longest message or mailbox value. If the MAXLEN value is set lower than the length of a message or mailbox value, the value is truncated. Refer to the *Configuration Guide* for more information.

 Valid Entry: standard tag name
 Valid Data Type: digital, analog, longana, float, message, mailbox

Network Alias

Alphanumeric alias name of 1 to 48 characters that FLLAN uses to transfer data on the network. Do not use a number for the first character. This name must match a name assigned to a database f in a send operation on a remote station.

The alias name is a tag name used globally by all stations on the network. It identifies data being sent from one station to another. Define this name on the sending station and reference it on all stations that receive data from the sending station.

If you use an alias name, you can be more flexible when naming elements among systems. For instance, at one station an analog element may be called `alm7`, while at another station an analog element containing the same data may be called `temphigh`. To transfer data across the network from `alm7` to `temphigh`, you can designate an alias name, such as `hot`, for that data.

If you leave this field blank, FLLAN uses the name in the Tag Name field as the network alias; therefore, ensure the first 16 characters of each name in the Tag Name field are unique.

Valid Entry: an alphanumeric alias name of 1 to 48 characters

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **FLLAN**
- *Network Monitor Table*
-
-

NETWORK MONITOR TABLE

If you want to monitor the status of remote stations on the network, such as the number of transmissions a remote station has sent and received and whether these transmissions were successful, configure the Network Monitor table. This table consists of the Network Monitoring Information panel that defines the stations you want to monitor and the tags to hold the information.

You can monitor any or all FactoryLink stations on the network as long as they are running FLLAN.

The Network Monitor table is configured in the SHARED domain.

NETWORK MONITOR INFORMATION PANEL

Perform the following steps to configure the Network Monitor Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Network Monitoring in the Configuration Manager Main Menu to display the Network Monitor Information panel.

Station Name	Send State	Receive State	Send Count	Receive Count	Send Sequence	Receive Sequence
STATION2	S2_TRN_STAT	S2_RCVD_STAT	S2_SENT	S2_RCVD	PKT_SEQ_SENT	PKT_SEQ_R

Cancel Enter Exit

- 3 Specify the following information for this panel:

Station Name Name of the remote station you want to monitor. This name must match one of the station names in the LAN Remote Names panel.

Send State Name of an analog tag that contains the status of transmissions to the remote station. At run time this element uses the following values to indicate the status:

- 0 The remote station is available.
- 1 The remote station is not available and is not active yet.
- 3 The local station called the remote station, but the remote station did not respond.
- 6 One of the stations disconnected.

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- 7 The connection terminated permanently. This occurs if the remote station buffer is a different size from the local station buffer.
- 10 The remote station is ready to connect.
- 11 The remote station responded to a call request but it is not ready to receive data.
- 12 The remote station is ready to receive data. Use this value to ensure you have established communication with the remote node before sending any data. Refer to the *Configuration Guide* for more information.

Receive State Name of an analog tag to contain the status of transmissions from the remote station. At run time this element uses the following values to indicate the status:

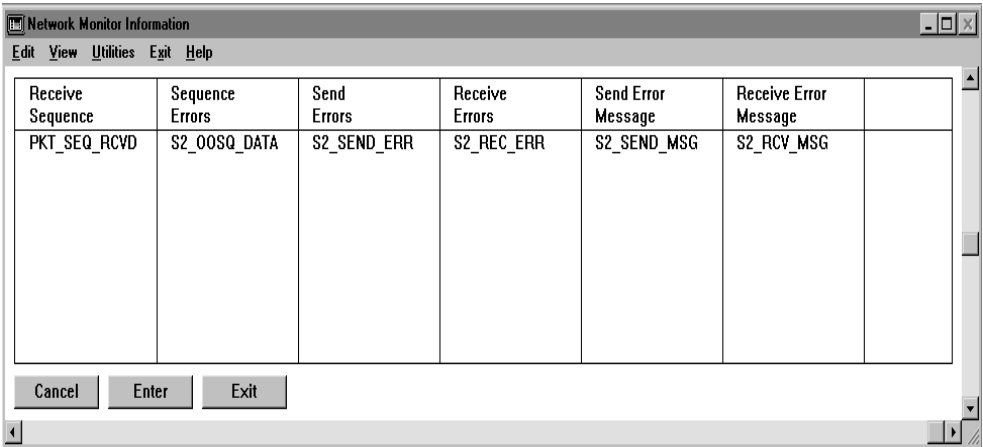
- 0 The remote station is available.
- 1 The remote station is not available and is not active yet.
- 2 The local station is listening for a call from the remote station.
- 6 One of the stations disconnected.
- 7 The connection terminated permanently. This occurs if FLLAN does not reset the remote station when it disconnects.
- 10 The remote station is ready to listen.
- 11 The remote station called the local station but the local station is not yet ready to receive data.
- 12 The local station is ready to receive data.

Send Count Name of an analog tag that counts the number of times the local station sends data to the remote station. FLLAN does not reset this value to 0 when the remote station disconnects.

Valid Entry: standard tag name
Valid Data Type: analog

Receive Count	<p>Name of an analog tag that counts the number of times the local station receives data from the remote station. FLLAN does not reset this value to 0 when the remote station disconnects.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog</p>
Send Sequence	<p>Name of an analog tag that indicates the number of the packet the local station sends.</p> <p>FLLAN assigns a number (called the send sequence number) for each packet the local station sends to the remote station you are monitoring. As the local station sends each packet, this number increments. You can monitor this number to see whether the local station is sending data packets in the correct order. FLLAN resets this value to 0 each time the stations reconnect.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog</p>
Receive Sequence	<p>Name of an analog tag that indicates the number of the packet the local station receives.</p> <p>FLLAN assigns a number (called the send sequence number) for each packet the local station sends to the remote station you are monitoring. As the local station receives each packet, this number increments. You can monitor this number to see whether the local station receives data packets in the correct order. FLLAN resets this value to 0 each time the stations reconnect.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog</p>

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Sequence Errors **Name of an analog tag that counts the number of times the local station sends or receives data out of sequence.**

Valid Entry: **standard tag name**

Valid Data Type: **analog**

Send Errors **Name of an analog tag that counts the number of times the local station could not successfully send data to the remote station. This usually occurs when the local station tries to send data to the remote station while the remote station is disconnected.**

Valid Entry: **standard tag name**

Valid Data Type: **analog**

Receive Errors **Name of an analog tag that counts the number of times the local station could not successfully receive data from the remote station. This usually occurs when the remote station is disconnected and the local station is waiting for data.**

Valid Entry: **standard tag name**

Valid Data Type: **analog**

Send Error Message **Name of a message tag that contains the latest error or status message for the send link for the remote station.**

Valid Entry: **standard tag name**

Valid Data Type: **message**

Receive Error Message **Name of a message tag that contains the latest error or status message for the receive link for the remote station.**

Valid Entry: **standard tag name**

Valid Data Type: **message**

- 4 Click on Enter to save the information.**
- 5 Click on Exit to return to the Main Menu.**

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FLLAN MESSAGES

If an error occurs with the FLLAN task at run time, an error message is displayed to the right of FLLAN on the shared Run-Time Manager screen or on the Network Monitor screen. This chapter lists all messages that can occur during FLLAN run time, describes their possible causes, and provides corrective actions.

Can't add local name to the network

- Cause:** Depending on the network protocol and the corresponding network service interface, this message may indicate different configuration errors. Each station on the network must have a unique name. If the network protocol is not loaded or active, the add name request fails and FLLAN will not continue.
- Action:** Ensure the network protocol software is loaded and active. Ensure the station name in the local file FLAPP/NET/LOCAL is unique for each FactoryLink station.

Can't bind to remote node-session closed

- Cause:** The bind process (initiating of communications) to the remote station failed because the remote station is not running.
- Action:** Ensure the remote station is running.
- Cause:** The network is not running on both sides.
- Action:** Ensure the network is running on both sides.
- Cause:** The remote station may be heavily used and cannot respond to the bind request within the number of seconds specified by the RX (timeout) parameter in the local station's file FLAPP/NET/LOCAL.
- Action:** Increase the RX parameter in the local station's file FLAPP/NET/LOCAL.

Can't determine domain name

- Cause:** No domain name is specified.
- Action:** Specify a domain at configuration time.

Can't determine local node name

Cause: FLLAN cannot open or cannot read the file FLAPP/NET/LOCAL because the file does not exist.

Action: Ensure the file exists.

Cause: FLLAN cannot open or cannot read the file FLAPP/NET/LOCAL because the file is corrupt.

Action: Ensure the file is not corrupt.

Cause: FLLAN cannot open or cannot read the file FLAPP/NET/LOCAL because the file contains an invalid station name.

Action: Ensure the file contains a valid station name.

Can't find network Monitor CT file

Cause: FLLAN cannot find the network monitor CT file because no Network Monitor tables are configured.

Action: Use the Configuration Manager Main Menu to configure the Network Monitor table.

Can't find Receive CT file

Cause: FLLAN cannot find the receive CT file because no Local Area Network Receive tables are configured.

Action: Use the Configuration Manager Main Menu to configure the Local Area Network Receive table.

Can't find Send CT file

Cause: FLLAN cannot find the send CT file because no Local Area Network Send tables have been configured.

Action: Use the Configuration Manager Main Menu to configure the Local Area Network Send table.

Can't match name to station entry-reply lost

Cause: Internal error.

Action: Contact Customer Support.

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Can't open groups file

Cause: FLLAN cannot open the GROUPS file FLAPP/NET/GROUPS either because the file does not exist or it is corrupt.

Action: Ensure the file exists and is not corrupt.

Can't write to LANsnd mbx-reply lost

Cause: Internal error.

Action: Contact Customer Support.

Connect request failed-session closed

Cause: The sending (local) station did not connect to the receiving (remote) station because the remote station is not running.

Action: Ensure the receiving (remote) station is running.

Cause: The network is not running on both sides.

Action: Ensure the network is running on both sides.

Cause: The remote station may be heavily used and cannot respond within the number of seconds specified by the RX (timeout) parameter in the local station's local file.

Action: Increase the RX parameter in the sending (local) station's local file.

Connected to *station_name*

Cause: A network connection is successfully established.

Action: None—information message only.

Couldn't send status to *station_name*-session closed

Cause: The local station tried to send a packet to the remote station but the remote station had closed the connection.

Action: No operator action required. FLLAN will attempt to reconnect.

Error establishing network connections

- Cause:** Either FLLAN cannot establish communications with any of its remote nodes or is temporarily unable to access the network.
- Action:** Ensure all nodes in the GROUPS file are known to the network. If FLLAN cannot access the network, wait one minute, then restart FLLAN.

Error opening send session

- Cause:** FLLAN did not get a response when it attempted to open a connection or to access a network device.
- Action:** None—FLLAN will retry the open.

Error opening session

- Cause:** FLLAN did not get a response when it attempted to open a connection or to access a network device.
- Action:** None—FLLAN will retry the open.

Error reading Monitor CT header

- Cause:** The Network Monitor CT file is corrupt.
- Action:** Rebuild the file by deleting the Network Monitor CT file and restarting FactoryLink.

Error reading Monitor CT index

- Cause:** The Network Monitor CT file is corrupt.
- Action:** Rebuild the file by deleting the Network Monitor CT file and restarting FactoryLink.

Error reading Monitor CT record

- Cause:** The Network Monitor CT file is corrupt.
- Action:** Rebuild the file by deleting the Network Monitor CT file and restarting FactoryLink.

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Error reading Receive CT header

Cause: The Receive CT file is corrupt.

Action: Rebuild the file by deleting the Receive CT file and restarting FactoryLink.

Error reading Receive CT index

Cause: The Receive CT file is corrupt.

Action: Rebuild the file by deleting the Receive CT file and restarting FactoryLink.

Error reading Receive CT record

Cause: The Receive CT file is corrupt.

Action: Rebuild the file by deleting the Receive CT file and restarting FactoryLink.

Error reading Send CT header

Cause: The Send CT file is corrupt.

Action: Rebuild the file by deleting the Send CT file and restarting FactoryLink.

Error reading Send CT index

Cause: The Send CT file is corrupt.

Action: Rebuild the file by deleting the Send CT file and restarting FactoryLink.

Error reading Send CT record

Cause: The Send CT file is corrupt.

Action: Rebuild the file by deleting the Send CT file and restarting FactoryLink.

Error writing *name* to rt dbase *number*

Cause: An error occurred when FLLAN performed a write to the FactoryLink real-time database.

Action: Rebuild the file by deleting the Receive CT file and restarting FactoryLink.
This message should not display unless a message reporting a Receive table is displayed during initialization.

Fllansnd failed while reading msg in mbx

Cause: Internal error.

Action: Contact Customer Support.

Global tag FLLANSIG not defined

Cause: The global interval timer element FLLANSIG is not defined.

Action: Choose Interval Timer from the Configuration Manager Main Menu and define an interval timer element named FLLANSIG.

Global tag FLLANSNDMBX not defined

Cause: The global mailbox element FLLANSNDMBX is not defined.

Action: Complete the following steps:

1. Open a text editor.
2. Open the file \AC\TITLES.
3. Add the line GLOBAL.AC to the file.
4. Save the file.
5. Exit the text editor and open the Configuration Manager Main Menu.
6. Choose Global Tags.
7. Enter the mailbox tag name FLLANSNDMBX when the Global Tags panel is displayed.

Internal error 1

Cause: Unknown internal error.

Action: Contact Customer Support.

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Invalid data type *data_type*

Cause: An invalid data type is indicated in a network packet. This is an error in LAN transfer protocol, which indicates the station where the packet originated supports a data type not supported on the local station.

Action: Ensure both stations are using compatible versions of the LAN software.

Invalid def. or syntax in local file

Cause: A definition in the FLAPP/NET/LOCAL file contains incorrect syntax.

Action: Choose Local Area Network Groups from the longana. On the LAN Local Name panel, ensure each parameter name is followed by an equal sign and a value.

Invalid definition in groups file

Cause: The format of a group definition is incorrect.

Action: Choose Local Area Network Groups from the long analog. On the LAN Remote Names panel, ensure each group name is followed by an equal sign, station names are separated by commas, and each group definition is terminated by a semicolon.

Invalid group name

Cause: An invalid group name exists in the GROUPS file.

Action: Open the GROUPS file, delete the invalid group name, and add a valid one.

Invalid group name in Receive CT

Cause: An invalid group name exists in the network configuration.

Action: Choose Local Area Network from the long analog and correct the group name on the LAN Receive Control panel or the LAN Receive Information panel.

OR

Add the group name to the GROUPS file. Choose Local Area

Network Groups from the longana and define the group on the LAN Remote Names panel.

Invalid group name in Send CT

Cause: An invalid group name exists in the network configuration.

Action: Choose Local Area Network from the long analog and correct the group name on the LAN Send Control panel or the LAN Send Information panel.

OR

Add the group name to the GROUPS file. Choose Local Area Network Groups from the long analog and define the group on the LAN Remote Names panel.

Invalid Monitor CT file

Cause: The Network Monitor CT file is corrupt.

Action: Rebuild the file by deleting the Network Monitor CT file and restarting FactoryLink.

Invalid option in local name file

Cause: The file FLAPP/NET/LOCAL contains an invalid parameter name.

Action: Choose Local Area Network Groups from the long analog. Ensure the syntax of all parameter names are correct in the LAN Local Names panel.

Invalid Receive CT file

Cause: The Receive CT file is corrupt.

Action: Delete the Receive CT file and restart FactoryLink to rebuild the file.

Invalid Send CT file

Cause: The Send CT file is corrupt. The table has an invalid send trigger.

Action: Delete the Send CT and restart FactoryLink to rebuild the file.

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Mailbox reply table full-reply lost

- Cause:** FLLAN is waiting on too many mailbox replies. Too many mailbox messages are being sent and/or the receiving tasks are not replying quickly enough.
- Action:** Reduce the number of mailbox messages being sent and/or ensure the receiving tasks are running so they can reply to the messages.

MAXLEN parameter specified is out of range

- Cause:** The size of the MAXLEN parameter is either too large or too small.
- Action:** Adjust the size of the MAXLEN parameter to fall within the valid range. The minimum size is 512 bytes. The maximum size depends on the operating system in use. Ensure this value is slightly larger than the longest message or mailbox element.

Mbx reply not matched in rply tbl-reply lost

- Cause:** FLLAN reset since the original message was sent. FLLAN cannot match replies to messages if FLLAN reset.
- Action:** Send the mailbox message again.

Mbx reply table entry timed out-reply lost

- Cause:** The task that received a mailbox message did not send a reply within the allotted time.
- Action:** Ensure the receiving task is running. Send the mailbox message again.

Mismatch in packet size

- Cause:** The network buffer size used by two stations does not match.
- Action:** Ensure the MAXLEN parameter in the FLAPP/NET/LOCAL file is the same on both stations, then restart both systems.

Network database option bit not set

- Cause:** The Local Area Network option is not enabled in the FactoryLink key.

Action: Run the UKEY utility to ensure the Local Area Network options are enabled in the FactoryLink key. Refer to *FactoryLink Fundamentals* for information about the UKEY utility.

Network database task init. failed, err *number*

Cause: FLLAN could not register with the kernel because either FLLANSND or FLLANRCV are missing from the System Configuration table.

Action: Choose System Configuration from the long analog. Ensure both FLLANSND and FLLANRCV are included on the System Configuration panel.

Network error writing to node *station name*

Cause: The remote station terminated the network connection.

Action: None—FLLAN will attempt to reconnect when the remote station is available again.

Network initialization failed

Cause: Network initialization failed.

Action: Check to ensure the network is installed and running and it matches the network identified to FLLAN configuration time.

No Monitor tags defined

Cause: The Network Monitor CT file does not contain any elements for storing network information. This is not a fatal error.

Action: Open and configure the Network Monitor table from the Configuration Manager Main Menu.

No receive tables configured for this task

Cause: The Receive CT file contains no tables; therefore, no data can be received.

Action: Use the Configuration Manager Main Menu to configure the Local Area Network Receive table.

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No remote groups have been defined

- Cause:** The GROUPS file (FLAPP/NET/GROUPS) contains no group definitions.
- Action:** Choose Local Area Network Groups in FLCM and add the appropriate group definitions to the LAN Remote Names panel.

No send tables configured for this task

- Cause:** The Send CT file contains no tables; therefore, no data can be sent.
- Action:** Use the Configuration Manager Main Menu to configure the Local Area Network Send table.

Not enough sessions available

- Cause:** The number of connections required to open network connections with all specified stations exceeds the value of the MAXSESS parameter in the FLAPP/NET/LOCAL file.
- Action:** Choose the Local Area Network Groups from the longana. If the MAXSESS parameter is specified on the LAN Local Names panel, increase its value. If not specified, add the parameter, allowing one connection for each station.

Out of RAM

- Cause:** The process could not allocate needed memory.
- Action:** Close any unnecessary windows or programs, such as the Application Editor or any text editor. If this error message is displayed often, depending on the operating system, more memory may need to be added to the system or the existing memory may need to be configured differently.

Received status timeout-session closed

- Cause:** No network packets were received from the remote station within the timeout period; the connection is closed.
- Action:** Increase the RX parameter in the FLAPP/NET/LOCAL file on the local station or decrease the TX parameter in the file on the remote station. The RX parameter should be greater than the TX parameter.

Remote MAXLEN size too small-session closed

- Cause:** The MAXLEN parameter in the local file on the remote station is smaller than the MAXLEN parameter on the local station. The MAXLEN on the remote (receiving) station must be equal to or greater than the MAXLEN on the local (sending) station.
- Action:** Ensure the MAXLEN parameter for the remote station is equal to or greater than that of the local station.

Remote node didn't send ACK-session closed

- Cause:** The sending (local) station did not receive an acknowledgment of data from the receiving (remote) station because the receiving station is not running.
- Action:** Ensure the receiving (remote) station is running.
- Cause:** The network is not running on both sides.
- Action:** Ensure the network is running on both sides.
- Cause:** The remote station may be heavily used and cannot respond within the number of seconds specified by the ACK parameter in the local station's local file.
- Action:** Increase the ACK parameter in the sending (local) station's local file.

Sequence error *station:expected number;received number*

- Cause:** FLLAN received a data packet out of order. This error can occur if data is being received faster than FLLAN can process it.
- Action:** Contact Technical Support.

Session closed *station_name*

- Cause:** The network connection to the specified FactoryLink station not established or terminated.
- Action:** None—FLLAN closes the connection and attempts to reconnect.

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Session closed: Error in network setup

- Cause:** Either the network software is not installed correctly or is not configured properly.
- Action:** Check the network software configuration. Refer to the vendor's installation instructions for installation and configuration information.

Session closed: File table overflow

- Cause:** The system is out of file descriptors.
- Action:** Increase the number of file descriptors available to the system. Refer to the operating system documentation for information about increasing file descriptors.

Session closed: Invalid node name format

- Cause:** A station name specified in the GROUPS file has an invalid format.
- Action:** Ensure all stations in the GROUPS file are valid. Refer to the network software documentation for valid station name formats.

Session closed: Network protocol error

- Cause:** An error occurred in the networking software.
- Action:** Note the error code displayed in the message and contact Customer Support.

Session closed: Remote FL/LAN isn't up

- Cause:** The remote station is not running or the remote station is not on the network or the FLLAN process on the remote station is not running.
- Action:** Ensure the remote station is running and is on the network, and the FLLAN process on the remote station is running.

Session closed: Unrecognized node name

- Cause:** A station in the GROUPS file is not known to the network.
- Action:** Ensure all stations in the GROUPS file are known to the network.

Table has an invalid Send trigger

- Cause:** A network Send table does not specify a valid trigger element and is not configured to Send on change. Thus, the values of elements specified in the table are never sent.
- Action:** Use either a valid element name to define a trigger element or enter YES in the Send on change field in the Send table.

Terminated state

- Cause:** This error usually follows the Mismatch error message and indicates the condition must be corrected.
- Action:** Ensure the MAXLEN parameter in the FLAPP/NET/LOCAL file is the same on both stations then restart both systems.

Type mismatch: *alias alias name*

- Cause:** The FLLAN task received a packet containing values from elements of a different data type than the destination elements. You cannot send elements of one data type to elements of another data type.
- Action:** Change the elements in the LAN Send Information panel on the sending station or in the LAN Receive Information panel on the receiving station. Ensure the data types of the sending and receiving elements are the same.

Unknown network alias: *datatype aliasname from station_name*

- Cause:** The FLLAN task received a packet containing values of the indicated data type and a network alias name that could not be found in the list of known aliases. The name of the sending station is included in the message.
- Action:** Choose Local Area Network from the longana. Add to the LAN Receive Information panel an element name with the indicated alias name.

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Unknown tag type in Receive CT

- Cause:** An element of a type not supported by the LAN protocol is encountered in a Receive table.
- Action:** Choose Local Area Network and remove elements whose data types are not supported (currently supported are digital, analog, longana, float, and message) from all LAN Receive Information panels.

Unknown tag type in Send CT

- Cause:** FLLAN encountered an element of a type not supported by the LAN protocol in a Send table.
- Action:** Open Local Area Network from the longana and remove elements whose data types are not supported from all LAN Send Information panels (currently supported are digital, analog, longana, float, and message).

Wrong FLLAN version on remote-session closed

- Cause:** The version of FLLAN installed on the remote station is 4.1 or earlier.
- Action:** Install version 4.4 (or later) of FLLAN on the remote node.

Wrong version, no length pkt-session closed

- Cause:** The version of FLLAN installed on the remote station is 4.1 or earlier.
- Action:** Install version 4.4 (or later) of FLLAN on the remote node.

Historian

The Historian task is the interface between FactoryLink and a relational database. It processes data requests from other FactoryLink tasks and sends them to the relational database. Data requests can store data in the relational database for Database or Data-Point Logging or retrieve data from the relational database for tasks like Trending or Database Browser.

FactoryLink can communicate with many different Historians. The Historian used depends on the relational database receiving the data request.

Configuration is predefined for the dBASE IV Historian and you will not need to configure an Historian if you are using Data-Point Logging. You need to know how to configure an Historian if you are using a different Historian or want to configure a Data-Point Logging table other than the ones provided with FactoryLink.

Historian Methodology

The following steps describe and illustrate how Historian processes data requests for a relational database:

1. A FactoryLink task sends a data request to a mailbox Historian services. This can be a request from Database or Data-Point Logging to store data in the relational database or from a task like Trending to retrieve data from the relational database. FactoryLink tasks submit their requests for data in the form of Structured Query Language (SQL) statements. In general, mailboxes are unidirectional; that is, a task requesting data from the Historian makes the request through a different mailbox than the mailbox Historian uses to return data.
2. Historian reads this mailbox and processes any queued data requests. It transmits the data request to the relational database server.
3. The relational database returns the requested information to the Historian if the request was to retrieve data.
4. Historian returns the requested data to the requesting task.

- **HISTORIAN**

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Supported Relational Databases

You receive dBASE IV Historian with FactoryLink. The dBASE IV Historian communicates with a dBASE IV relational database. If you use a different relational database in your application, you can configure an Historian that communicates with it. Each supported relational database has a different FactoryLink Historian. FactoryLink supports the following relational databases:

- dBASE IV
- Database2
- Informix
- Oracle7
- ODBC
- Sybase

You must add the desired Historian to the system configuration as a task if you want to configure an Historian other than or in addition to the dBASE IV Historian.

Review the considerations and information at the beginning of each chapter about specific Historians before configuring a particular Historian.

dBASE IV HISTORIAN

Complete the following panels to configure dBASE IV Historian:

- **Historian Mailbox Information**—Defines each mailbox the Historian services. Refer to “dBASE IV Historian Mailbox Information Panel” on page 230 for details.
- **Historian Information**—Defines information needed to connect the Historian to the relational database. Refer to “dBASE IV Historian Information Panel” on page 231 for details.

- **HISTORIAN**
- *dBASE IV Historian Mailbox Information Panel*
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dBASE IV HISTORIAN MAILBOX INFORMATION PANEL

Perform the following steps to configure the Historian Mailbox Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Historian for dBASE IV(R) in the Configuration Manager Main Menu to display the Historian Mailbox Information for dBASE IV panel.

Historian Mailbox	

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:

Historian Mailbox Name of a mailbox this Historian services. This name must match the name defined in the task using Historian to process data requests.

You must create a separate mailbox for each task that submits data requests except for Database Logging and Trending, which can share a mailbox.

Valid Entry: standard tag name

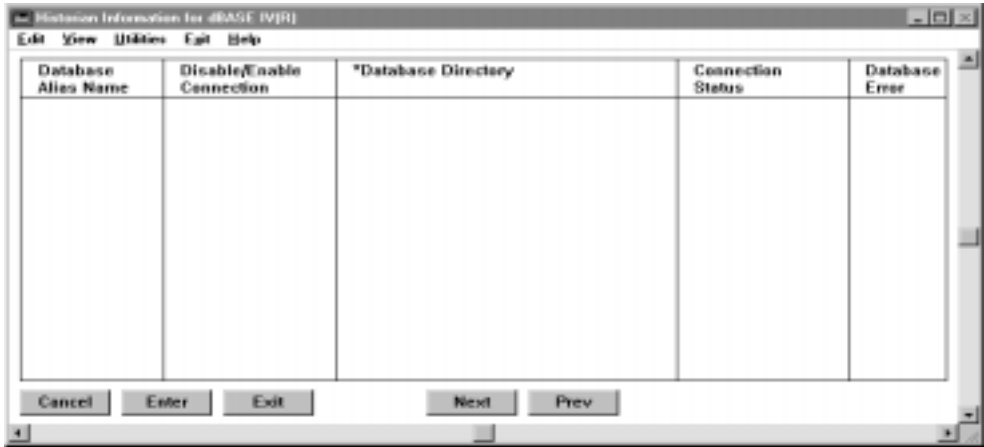
Valid Data Type: mailbox

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

DBASE IV HISTORIAN INFORMATION PANEL

Perform the following steps to configure the dBASE IV Historian Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Historian for dBASE IV(R) in the Configuration Manager Main Menu to display the Historian Information for dBASE IV panel.



- 3 Specify the following information for this panel:

Database Alias Name Unique name that represents a database connection.

Valid Entry: database connection name

Disable/ Enable Connection Name of a digital tag that enables or disables the connection.
When this tag is set to 1, the connection to the relational database defined in this entry is closed; when set to 0, the connection opens.

Note: Database aliases should not share connection tags. Sharing connection tags between database aliases can result in errors.

Valid Entry: standard tag name

Valid Data Type: digital

- **HISTORIAN**

- *dBASE IV Historian Information Panel*

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Database Directory Path name of the directory where the database resides. This directory must exist before starting this Historian at run time. This path can either be a constant or a tag name.

If you specify a constant, precede the constant by a single quote.

If you specify a tag name, the tag specified must be of type message. You must specify the directory path where the database resides in the tag Default Value field and a length in the Length field that accommodates the longest directory path you might define for this tag. If the directory path exceeds the defined length, it is truncated and the connection is not be made. For best results, define 254 as the length.

Valid Entry: standard tag name or constant

Valid Data Type: tag name: message of up to 254 characters

Connection Status Name of an analog tag to receive the status of the connection between the Historian and the relational database. Refer to Configuration Guide for a description of the state values.

Note: Database aliases should not share status tags. Sharing status tags between database aliases can result in errors.

Valid Entry: standard tag name

Valid Data Type: analog

Database Error Name of a tag to receive the error value passed from the database software.

The tag should correspond to the type of error sent by the relational database.

Valid Entry: standard tag name

Valid Data Type: longana, message

4 Click on Enter to save the information.

5 Click on Exit to return to the Main Menu.

INFORMIX HISTORIAN

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Historian

Complete the following panels to configure Informix Historian:

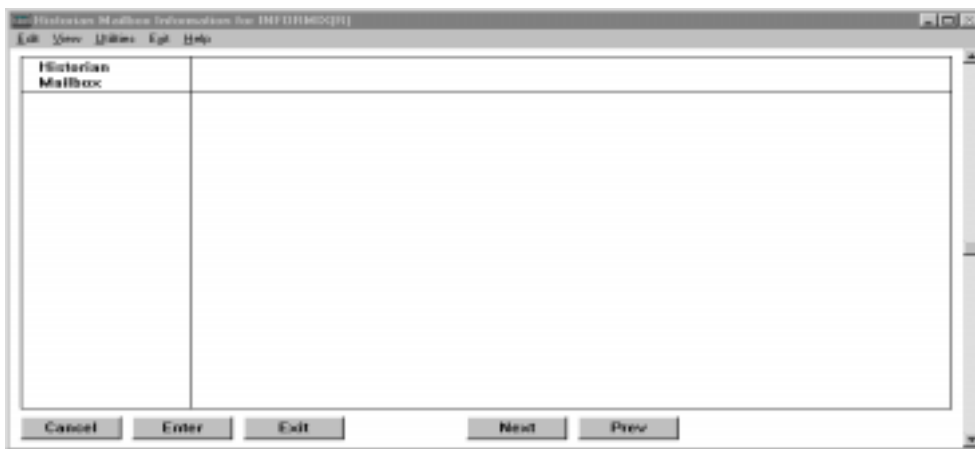
- **Historian Mailbox Information**—Defines each mailbox the Historian services. Refer to “Informix Historian Mailbox Information Panel” on page 234 for details.
- **Historian Information**—Defines information needed to connect the Historian to the relational database. Refer to “Informix Historian Information Panel” on page 235 for details.

- **HISTORIAN**
- *Informix Historian Mailbox Information Panel*
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INFORMIX HISTORIAN MAILBOX INFORMATION PANEL

Perform the following steps to configure the Informix Historian Mailbox Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Historian for Informix(R) in the Configuration Manager Main Menu to display the Historian Mailbox Information for Informix panel.



- 3 Specify the following information for this panel:

Historian Mailbox Name of a mailbox an Historian services. This name must match the name defined in the task using Historian to process data requests.

Create a separate mailbox for each task that submits data requests except for Database Logging and Trending, which can share a mailbox.

Valid Entry: **mailbox name**

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

INFORMIX HISTORIAN INFORMATION PANEL

Perform the following steps to configure the Informix Historian Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Historian for Informix(R) in the Configuration Manager Main Menu to display the Historian Information for Informix panel.

Database Alias Name	Disable/Enable Connection	*INFORMIX Database Server Name	*INFORMIX Database Name	Connection Status

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:

Database Alias Name Unique name to represent a database connection. This must match the database name defined in the task using Historian to process data requests.

Valid Entry: database connection name

Disable/ Enable Connection Name of a digital tag that enables or disables the connection. When this tag is set to 1, the connection to the relational database defined in this entry is closed; when set to 0, the connection opens.

Note: Database aliases should not share connection tags. Sharing connection tags between database aliases can result in errors.

Valid Entry: standard tag name

Valid Data Type: digital

- **HISTORIAN**

- *Informix Historian Information Panel*

-
-

*INFORMIX Database Server Name	<p>Database server name as defined in the SQLHOSTS file. Leave this field blank if you want to use the default server. This can either be a constant or a tag name.</p> <p>If you enter a constant, precede the database server name with a single quote.</p> <p>If you enter a tag name, the tag specified must be of type message. You must specify the database server name in the tag Default Value field and a length in the Length field that accommodates the longest database server name you might define for this tag. If the database server name exceeds the defined length, it is truncated and the connection is not made. For best results, define 16 as the length.</p> <p>Valid Entry: standard tag name or string constant</p> <p>Valid Data Type: tag name: message or string constant of up to 16 characters</p>
*INFORMIX Database Name	<p>Database name of the database in use; the name assigned through the CREATE DATABASE SQL statement. The Informix DBPATH variable must be defined on the host where the database resides. This database must exist before starting this Historian at run time. This database name can either be a constant or a tag name.</p> <p>If you enter a constant, precede the database name with a single quote.</p> <p>If you enter a tag name, the tag specified must be of type message. You must specify the database name in the tag Default Value field and a length in the Length field that accommodates the longest database name you might define for this tag. If the database name exceeds the defined length, it is truncated and the connection is not made. For best results, define 64 as the length.</p> <p>Valid Entry: standard tag name or string constant</p> <p>Valid Data Type: tag name: message or string constant of up to 64 characters</p>
Connection Status	<p>Name of an analog tag that defines the state of this connection. Refer to <i>Configuration Guide</i> for a description of the possible values and their states.</p> <p>Note: Database aliases should not share status tags. Sharing status tags between database aliases can result in errors.</p> <p>Valid Entry: standard tag name</p>

Valid Data Type: **analog**

Database Error Name of a tag to receive the error value passed from the database software.

The tag should correspond to the type of error sent by the relational database. If it is a number, use long analog; if it is text, use message.

Valid Entry: **standard tag name**

Valid Data Type: **longana, message**

The Database Error tag is updated only when a fatal error is defined in the FLHST.INI file or if a database open connect call fails.

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **HISTORIAN**
- *ODBC Historian*
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ODBC HISTORIAN

To configure ODBC Historian, you need to:

1. Install a driver for each relational database management system FactoryLink is to open.
2. Connect a data source to an installed driver.

Refer to the Microsoft® ODBC Desktop Database Drivers *Getting Started* and the *INTERSOLV DataDirect ODBC Drivers Reference* book for additional information and instructions for steps 1 and 2.

3. Set up driver sources. Refer to “Setting up the ODBC Drivers and Data Sources” on page 238 for details.
4. Define FactoryLink panels. Connection information is defined in the following panels:
 - Historian Mailbox Information—Defines each mailbox an Historian services. Refer to “ODBC Historian Mailbox Information Panel” on page 244 for details.
 - Historian Information—Defines information needed to connect the Historian to the relational database. Refer to “ODBC Historian Information Panel” on page 245 for details.

Setting up the ODBC Drivers and Data Sources

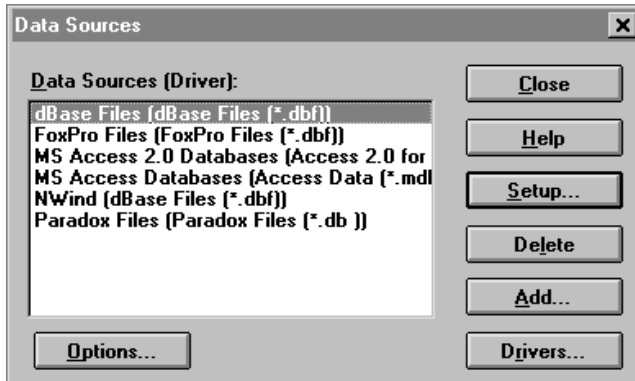
The in-depth information regarding a supported driver, its data sources, and network connections are not within the scope of this book. Refer to the documentation set associated with the software for detailed information you have questions about.

Use the ODBC Administrator to add and delete drivers, and to add, configure, and delete data sources. Open the ODBC Administrator from the Control Panel.

After you install an ODBC driver, define one or more data sources for it. A data source name should provide a unique description of the data it contains.

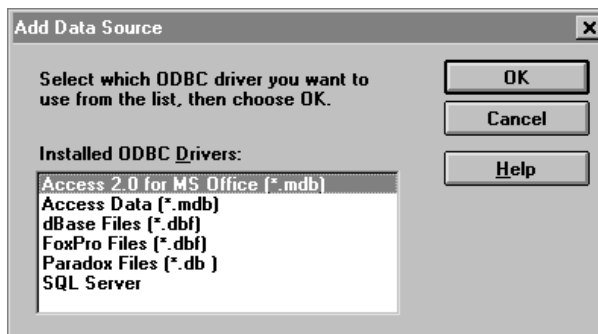
Data Sources Dialog

The data sources defined for the currently installed drivers are displayed in the Data Sources (Driver) list box within the Data Sources dialog.



Perform the following steps to define a driver as part of the data source definition:

- 1 Click on Add to display names of the installed drivers in the Add Data Source dialog.



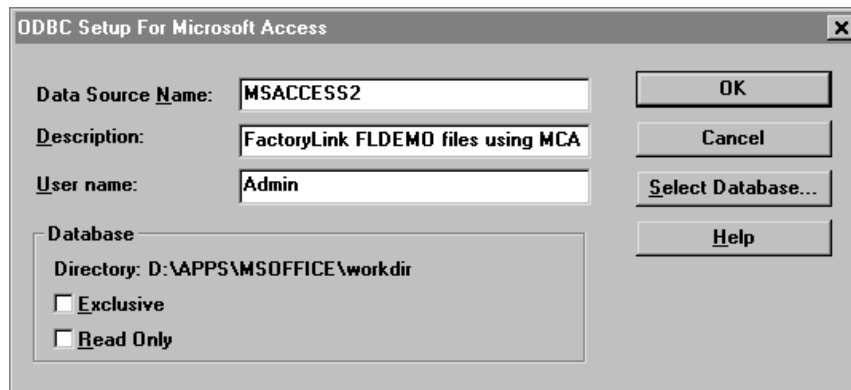
- 2 Choose the driver from the Installed ODBC Drivers list you want to define as part of the data source definition.
- 3 Click on OK to display the Setup screen for the driver you just chose. Refer to “Data Sources Dialog” on page 239 for the set up instructions on each supported driver.

- HISTORIAN
- ODBC Historian
-
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Defining Drivers

Within this section are subsections, one for each driver you can define. Within each subsection is the Setup screen for that driver and the syntax for the data source you must enter in that screen and on the ODBC Historian Information panel.

Setting up the Microsoft Access Driver and Data Source.



Perform the following steps to complete the Microsoft Access 2.0 Setup dialog:

- 1 Enter the required information, then click on Create. The syntax of the Data Source Name—DSN—is

DSN=xxxxxxxx

where xxxxxxxx is the *data_source_name*

or

DSN=*data_source_name*[;*attribute=value*;*attribute=value*...]

The Data Source Name—DSN—you type in this dialog must be used in the FactoryLink Historian for ODBC Information panel explained in “ODBC Historian Information Panel” on page 245.

Refer to the *Microsoft® ODBC Desktop Database Drivers Getting Started Guide* for details on the set-up information you must enter.

- 2 Type the database name and click on OK to display the Data Sources screen listing the Data Source Name you just added.

- 3 Click on Close to close the ODBC Administrator.

Setting up the Oracle7 Server Driver and Data Source

The Oracle Server driver supports the Oracle 7 database system available from Oracle. Refer to the *INTERSOLV DataDirect ODBC Drivers Reference Guide* for information on the setup information you must enter.



Perform the following steps to complete the Oracle7 Server Driver and Data Source Setup dialog:

- 1 Type the required information. The syntax of the Data Source Name is

`data_source_name[;attribute=value[;attribute=value...]]`

The Data Source Name—DSN—you type in this dialog must be used in the FactoryLink Historian for ODBC Information panel explained in “ODBC Historian Information Panel” on page 245.

- 2 Click on OK to display the Data Sources screen listing the Data Source Name you just added.
- 3 Click on Close to close the ODBC Administrator.

- **HISTORIAN**
- *ODBC Historian*
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Setting up the SQL Server Driver and Data Source

The SQL Server driver supports the SQL Server database system available from Microsoft and Sybase. Refer to the *INTERSOLV DataDirect ODBC Drivers Reference Guide* for information on the setup information you must enter.



Perform the following steps to complete the SQL Server Driver and Data Source Setup dialog:

- 1 Type the required information. The syntax of the Data Source Name is

`DSN=data_source_name[;attribute=value[;attribute=value...]]`

The Data Source Name—DSN—you type in this dialog must be used in the FactoryLink Historian for ODBC Information panel explained in “ODBC Historian Information Panel” on page 245.

- 2 Set the Two Phase Commit to ON for FactoryLink to work with the SQL Server. Activate this setting in either of two ways:
 - by setting a check in the box on the ODBC SQL Server Driver Setup dialog
 - by entering `TPC=1` in the connect string on the Historian Information panel
- 3 Type the database name, then click on OK to display the Data Sources screen listing the Data Source Name you just added.

- 4 Click on Close to close the ODBC Administrator.

Setting up the Sybase System 10 Driver and Data Source

The Sybase System 10 driver supports the SQL Server 10 database system available from Sybase. Refer to the *INTERSOLV DataDirect ODBC Drivers Reference* book for information on the setup information you must enter.



Perform the following steps to complete the Sybase System 10 Driver and Data Source Setup dialog:

- 1 Type the required information, then click on Create. The syntax of the Data Source Name is

`DSN=data_source_name[;attribute=value[;attribute=value...]]`

The Data Source Name—DSN—you type in this dialog must be used in the FactoryLink Historian for ODBC Information panel explained in “ODBC Historian Information Panel” on page 245.

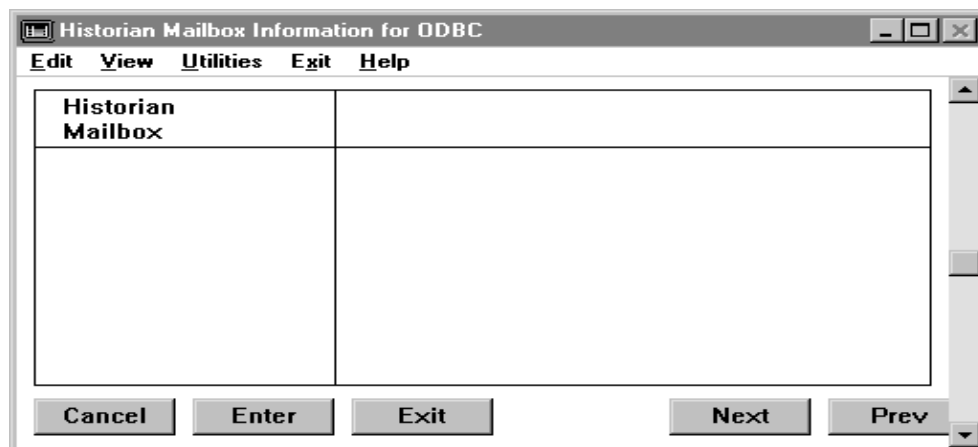
- 2 Type the database name, then click on OK to display the Data Sources screen listing the Data Source Name you just added.
- 3 Click on Close to close the ODBC Administrator.

- **HISTORIAN**
- *ODBC Historian Mailbox Information Panel*
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-

ODBC HISTORIAN MAILBOX INFORMATION PANEL

Perform the following steps to configure the ODBC Historian Mailbox Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Historian for ODBC in the Configuration Manager Main Menu to display the Historian Mailbox Information for ODBC panel.



- 3 Specify the following information for this panel:

Historian Mailbox Name of a mailbox this Historian services. This name must match the name defined in the task using Historian to process data requests.

Create a separate mailbox for each task that submits data requests except for Database Logging and Trending, which can share a mailbox.

Valid Entry: standard tag name

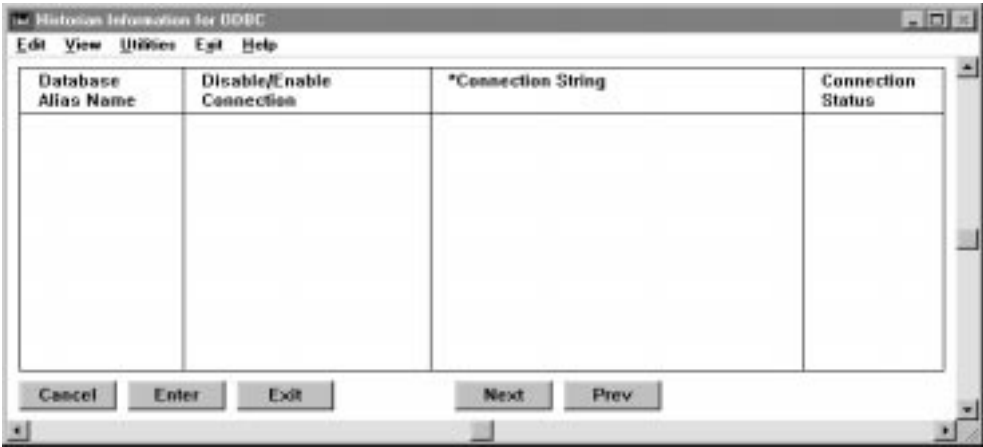
Valid Data Type: mailbox

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

ODBC HISTORIAN INFORMATION PANEL

Perform the following steps to configure the ODBC Historian Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Historian for ODBC in the Configuration Manager Main Menu to display the Historian Information for ODBC panel



- 3 Specify the following information for this panel:

Database Alias Name Unique name to represent a database connection. This must match the database name defined in the task using Historian to process data requests.

Valid Entry: database connection name

Disable/ Enable Connection Name of a digital tag that enables or disables the connection. When this tag is set to 1, the connection to the relational database defined in this entry is closed; when set to 0, the connection opens.

Note: Database aliases should not share connection tags. Sharing connection tags between database aliases can result in errors.

Valid Entry: standard tag name

Valid Data Type: digital

- **HISTORIAN**
- *ODBC Historian Information Panel*
-
-

***Connection String** Connect string required to connect to the database. The connection string information defined in an ODBC driver setup must match what you define in the FactoryLink ODBC Historian Information panel. Use either a short DSN name or long *data_source_name* in the connection string as defined below.

DSN=xxxxxxxxx

where

xxxxxxxxx Is the name of the database

DSN=*data_src*[:*attribute=value*[:*attribute=value*].]

where

data_src Identifies a data source configuration defined in the ODBC.INI file, such as MSACCESS2 defined for Access 2.0.

[*attribute= value...*] Provides optional pairs of information, such as a user ID and password, used when more information or overrides are needed to log on. The default values are those set in driver dialogs.

Information specified in a connection string either adds to the data source information defined in the Setup dialog for each driver or it overrides it.

This can either be a constant or a tag name.

If you enter a constant, precede the connect string with a single quote.

If you enter a tag name, you must specify the connect string in the tag Default Value field and a length in the Length field that accommodates the longest connect string you might define for this tag. If the connect string exceeds the defined length, it is truncated and the connection is not made. For best results, define 256 as the length.

Valid Entry: standard tag name or string constant

Valid Data Type: tag name or string constant of up to 254 characters

To connect to a local Oracle database, enter the connection string as DSN=*data_src*; SRVR=; UID=*userid*; PWD=*password*.

Connection Status Name of an analog tag that defines the state of this connection. Refer to *Configuration Guide* for a description of the possible values and their states.

Note: Database aliases should not share status tags. Sharing status tags between database aliases can result in errors.

Valid Entry: standard tag name

Valid Data Type: analog

Database Error Name of a tag to receive the error value passed from the database software.

The tag should correspond to the type of error the relational database sent. If it is a number, use long analog; if it is text, use message.

Valid Entry: standard tag name

Valid Data Type: longana, message

The Database Error tag is only updated when a fatal error is defined in the FLHST.INI file or if a database open connect call fails.

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **HISTORIAN**
- *Oracle Historian*
-
-

ORACLE HISTORIAN

FactoryLink supports Historian for Oracle that works with Oracle.

Complete the following panels to configure Oracle Historian:

- **Historian Mailbox Information**—Defines each mailbox the Historian services. Refer to “Oracle Historian Mailbox Information Panel” on page 249 for details.
- **Historian Information**—Defines information needed to connect the Historian to the relational database. Refer to “Oracle7 Historian Information Panel” on page 250 for details.

ORACLE HISTORIAN MAILBOX INFORMATION PANEL

Perform the following steps to configure the Oracle Historian Mailbox Information panel:

- 1 Ensure the domain selected is correct on the Configuration Manager Domain Selection box.
- 2 Choose Historian for Oracle7(R) on the Configuration Manager Main Menu to display the Historian Mailbox Information for Oracle7 panel.

Historian Mailbox	

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:

Historian Mailbox Name of a mailbox serviced by this Historian. This name must match the name defined in the task using Historian to process data requests.

Create a separate mailbox for each task that submits data requests except for Database Logging and Trending, which can share a mailbox.

Valid Entry: standard tag name

Valid Data Type: mailbox

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **HISTORIAN**
- *Oracle7 Historian Information Panel*
-
-

ORACLE7 HISTORIAN INFORMATION PANEL

Perform the following steps to configure the Oracle7 Historian Information panel:

- 1 Ensure the domain selected is correct on the Configuration Manager Domain Selection box.
- 2 Choose Historian for Oracle7(R) on the Configuration Manager Main Menu to display the Historian Information for Oracle7 panel.

Database Alias Name	Disable/Enable Connection	*Oracle User Name	*Oracle Password	*SQL*Net Connect String

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:

Database Alias Name

Unique name to represent a database connection. This must match the database name defined in the task using Historian to process data requests.

Valid Entry: database connection name

Disable/ Enable Connection

Name of a digital tag that enables or disables the connection. When this tag is set to 1, the connection to the relational database defined in this entry is closed; when set to 0, the connection opens.

Note: Database aliases should not share connection tags. Sharing connection tags between database aliases can result in errors.

Valid Entry: standard tag name

Valid Data Type: digital

*Oracle User Name	<p>Login name required to connect to the database. This name must be a valid Oracle account with connect, read/write, and create access to database tables. This name can either be a constant or a tag name.</p> <p>If you enter a constant, precede the user name with a single quote.</p> <p>If you enter a tag name, you must specify a login name in the tag Default Value field and a maximum length of 32 in the Length field.</p> <p>Valid Entry: standard tag name or constant</p> <p>Valid Data Type: tag name: message of up to 32 characters</p>
*Oracle Password	<p>Password required to connect to the database. This password can either be a constant or a tag name.</p> <p>If you enter a constant, precede the password with a single quote.</p> <p>If you enter a tag, you must specify a password name in the tag Default Value field and a maximum length of 32 in the Length field.</p> <p>Valid Entry: standard tag name or constant</p> <p>Valid Data Type: tag name: message of up to 32 characters</p>
*SQL *NET Connect String	<p>SQL*Net connect string required to connect to the database. Leave this field blank if you want to use the default connection. This can either be a constant or a tag name.</p> <p>If you enter a constant, precede the connect string with a single quote.</p> <p>If you enter a tag, you must specify the connect string in the tag Default Value field and a length in the Length field that accommodates the longest connect string you might define for this tag. If the connect string exceeds the defined length, it is truncated and the connection will not be made. For best results, define 64 as the length.</p> <p>Valid Entry: standard tag name or constant</p> <p>Valid Data Type: tag name: message of up to 64 characters</p>
Connection Status	<p>Name of an analog tag that defines the state of this connection. Refer to <i>Configuration Guide</i> for a description of the possible values and their states.</p>

Note: Database aliases should not share status tags. Sharing status tags between database aliases can result in errors.

Valid Entry: standard tag name

- **HISTORIAN**
- *Oracle7 Historian Information Panel*
-
-

Valid Data Type: **analog**

Database Error **Name of a tag to receive the error value passed from the database software.**

The tag should correspond to the type of error sent by the relational database. If it is a number, use longana; if it is text, use message.

Valid Entry: **standard tag name**

Valid Data Type: **longana, message**

- 4 Click on Enter to save the information.**
- 5 Click on Exit to return to the Main Menu.**

SYBASE HISTORIAN

Complete the following panels to configure Sybase Historian:

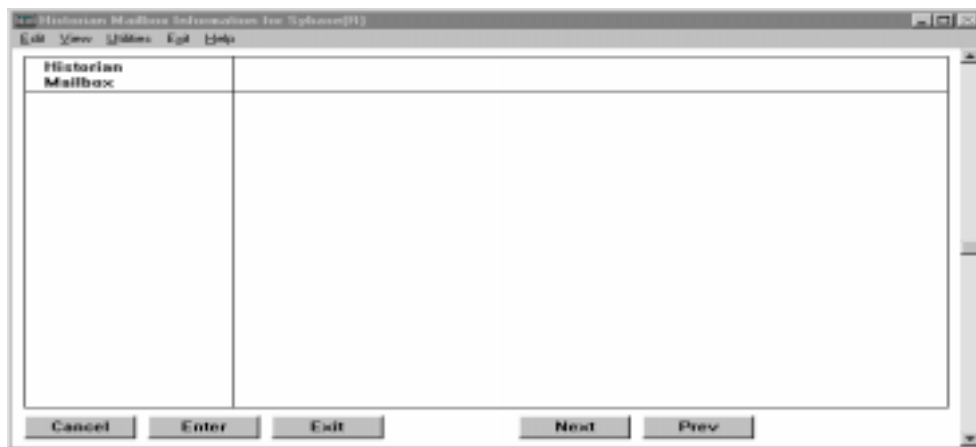
- **Historian Mailbox Information**—Defines each mailbox an Historian services. Refer to “Sybase Historian Mailbox Information Panel” on page 254 for details.
- **Historian Information**—Defines information needed to connect the Historian to the relational database. Refer to “Sybase Historian Information Panel” on page 255 for details.

- **HISTORIAN**
- *Sybase Historian Mailbox Information Panel*
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-

SYBASE HISTORIAN MAILBOX INFORMATION PANEL

Perform the following steps to configure the Sybase Historian Mailbox Information panel:

- 1 Ensure the domain selected is correct on the Configuration Manager Domain Selection box.
- 2 Choose Historian for Sybase(R) on the Configuration Manager Main Menu to display the Historian Mailbox Information for Sybase panel.



- 3 Specify the following information for this panel:

Historian Mailbox Name of a mailbox serviced by this Historian. This name must match the name defined in the task using Historian to process data requests.

Create a separate mailbox for each task that submits data requests except for Database Logging and Trending, which can share a mailbox.

Valid Entry: **standard tag name**

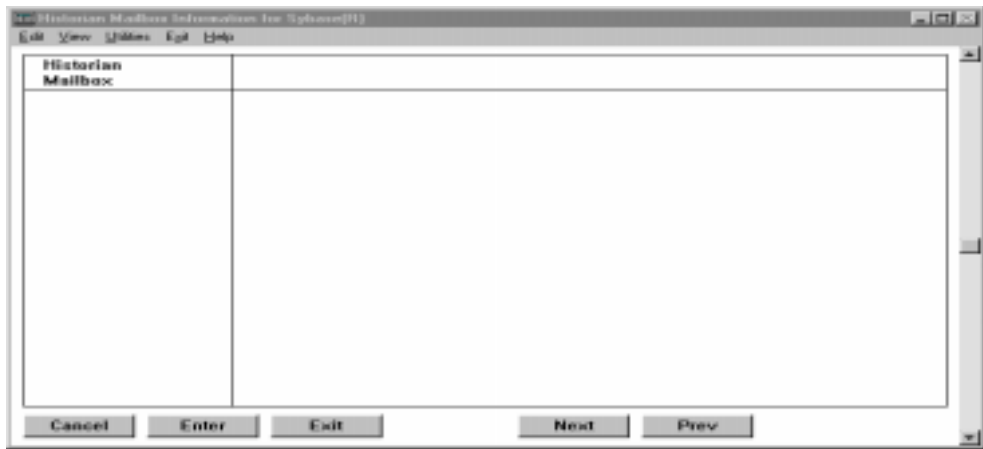
Valid Data Type: **mailbox**

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

SYBASE HISTORIAN INFORMATION PANEL

Perform the following steps to configure the Sybase Historian Information panel:

- 1 Ensure the domain selected is correct on the Configuration Manager Domain Selection box.
- 2 Choose Historian for Sybase(R) on the Configuration Manager Main Menu to display the Historian Information for Sybase panel.



- 3 Specify the following information for this f:

Database Alias Name Unique name to represent a database connection. This must match the database name defined in the task using Historian to process data requests.

Valid Entry: database connection name

Disable/ Enable Connection Name of a digital tag that enables or disables the connection. When this tag is set to 1, the connection to the relational database defined in this entry is closed; when set to 0, the connection opens.

Note: Database aliases should not share connection tags. Sharing connection tags between database aliases can result in errors.

Valid Entry: standard tag name

Valid Data Type: digital

- **HISTORIAN**

- *Sybase Historian Information Panel*

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***Server Name** Path to the database server this Historian is to connect to. This name can either be a constant or a tag name.

If you enter a constant, precede the path with a single quote.

If you enter a tag name, you must specify the path where the server is running in the tag Default Value field and a maximum length of 32 in the Length field.

For UNIX platforms, if this field is left blank, the server name that corresponds to the value of the DSQUERY environment variable is used. If the DSQUERY environment variable is not set, the server name defaults to SYBASE.

Valid Entry: standard tag name or constant

Valid Data Type: tag name: message of up to 32 characters

***Database Name** Path name of the directory where the database resides. This directory must exist before starting this Historian at run time. This path can either be a constant or a tag name.

If you enter a constant, precede the path with a single quote.

If you enter a tag name, you must specify the path where the database resides in the tag Default Value field and a maximum length of 32 in the Length field.

Valid Entry: standard tag name or constant

Valid Data Type: tag name: message of up to 32 characters

***Server User Name** Login name required to connect to the database. This name must be a valid Sybase account with connect, read/write, and create access to database tables. This name can either be a constant or a tag name.

If you enter a constant, precede the path with a single quote.

If you enter a tag name, you must specify a login name in the tag Default Value field and a maximum length of 32 in the Length field.

Valid Entry: standard tag name or constant

Valid Data Type: tag name: message of up to 32 characters

***Server Password** Password required to connect to the database. This password can either be a constant or a tag name.

If you enter a constant, precede the path with a single quote.

If you enter a tag name, the tag specified must be of the type message. You must specify a password in the tag Default Value field and a maximum length of 32 in the Length field.

Valid Entry: standard tag name or constant
 Valid Data Type: tag name: message of up to 32 characters

Connection Status Name of an analog tag that defines the state of this connection. Refer to *Configuration Guide* for a description of the possible values and their states.

Note: Database aliases should not share status tags. Sharing status tags between database aliases can result in errors.

Valid Entry: standard tag name
 Valid Data Type: analog

Database Error Name of a tag to receive the error value passed from the database software.

The tag specified must be one of the following types: message or long analog. It should correspond to the type of error sent by the relational database. If it is a number, use longana; if it is text, use message.

Valid Entry: standard tag name
 Valid Data Type: longana, message

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **HISTORIAN**
- *Historian Messages*
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HISTORIAN MESSAGES

Messages may come from FactoryLink, a database driver, or data source. Messages communicate a status or a condition that may or may not require an action from you. This section explains the messages logged and, where appropriate, what action to take.

Run-time Messages

FactoryLink Historians generally do not write error messages generated from a data source to the Task Status tag. The Historian reports all database errors to its log file and returns a status code to the Historian client tasks, such as Database Browser for every Historian operation.

Errors and messages may display as your FactoryLink application runs. FactoryLink sends a code or message to the Run-Time Manager screen for display whenever an error occurs in an Historian or an Historian-client task. You can also define an output text object to display codes and messages on a graphics screen.

FactoryLink also sends a longer, more descriptive message to the log file when the log file Program Argument is set. This section describes the error codes and messages displayed on the Run-Time Manager screen.

The Task Status tag is located on the System Configuration Information panel. The data type you assign to this tag for an Historian and any FactoryLink task determines the type of codes written to this tag.

The data types you can assign are

- Digital data type reports these two codes
 - 0—indicates the requested operation successfully completed
 - 1—indicates an error occurred
- Analog, longana, or float data type

An Historian generates the following codes. These status codes are returned to all tasks requesting data from an Historian. See “Database Browser Status Codes and Status Messages” on page 45 for status codes and status messages for Browser.

Table 120-1 Error Codes Generated While Communicating to an Historian Task

Code	Error	Cause	Action
-1	A FactoryLink error occurred.	A read or a write to a mailbox occurred for either an Historian-client task or an Historian task.	Contact Customer Support.
0	Successful operation with no return data.	Historian operation was successful.	No action required.
1	Successful operation with return data.	Historian operation was successful.	No action required.
2	Unsolicited data sent to an Historian client task.	An unsolicited fetch was performed for an Historian-client task.	No action required.
3	Maximum OPEN connections exceeded.	An Historian-client task tried to access data from more than 10 unique database aliases.	Reference fewer than 10 unique database aliases for an Historian-client task.
4	A dynamic memory allocation operation failed.	An internal error occurred in an Historian-client task or in an Historian task.	Contact Customer Support.
5	Historian-client task referenced an invalid Historian connection handle.	An internal error occurred within an Historian-client task.	Contact Customer Support.
6	Failed to prepare an Historian statement handle.	An internal error occurred within an Historian-client task.	Contact Customer Support.

- **HISTORIAN**
- *Historian Messages*
-
-

Table 120-1 Error Codes Generated While Communicating to an Historian Task

Code	Error	Cause	Action
7	Invalid stmtid returned from historian	<p>1) Historian shut down before Browser or another Historian-client task shut down.</p> <p>2) An error occurred within an Historian-client task.</p>	<p>1) Shut down all Historian-client tasks running on the system. Then, shut down the Historian. Then, start up the Historian and then Browser and all other Historian-client tasks running on the system.</p> <p>2) Contact Customer Support.</p>
8	Last row fetched, or no rows affected by SQL operation.	Historian task operation affected no rows for an UPDATE, DELETE operation or a FETCH for a SELECT operation reached the end of the result table. In addition, for Database Browser an attempt to move past the end or before the beginning of the result table generates this error code.	No action required. An informational message only. Appropriate action is a FactoryLink application logic decision.
9	An Historian database alias is invalid.	An Historian-client task referenced an Historian Database Alias that does not match any of the entries defined in the Historian Information panel.	Ensure all Historian database aliases referenced by the Historian-client task exist in the Historian Information panel.

Table 120-1 Error Codes Generated While Communicating to an Historian Task

Code	Error	Cause	Action
10	An operation exceeded its maximum timeout period.	<p>1. The mailbox specified as an Historian mailbox is not listed in the Historian mailbox panel.</p> <p>2. SQL operation is taking too long to perform.</p> <p>3. Historian task is busy with other operations and is unable to service new Historian-client requests.</p>	<p>1. Occurs in an OPEN connection call. Ensure mailbox exists in the Historian mailbox panel.</p> <p>2. Set the program arguments to -L2 -X on the Historian to figure out how long the database server is taking to perform SQL operation. Either change the SQL statement to perform less work or have the database server to this operation instead of the Historian task.</p> <p>3. Slow down the amount of work the Historian is doing by either ensuring the SQL operations are not time consuming or slow down the Database Logger to trigger less frequently.</p>

- **HISTORIAN**
- *Historian Messages*
-
-

Table 120-1 Error Codes Generated While Communicating to an Historian Task

Code	Error	Cause	Action
11	An Historian-client task passed an invalid Historian connection handle to an Historian.	<p>1. The Historian task was terminated before other Historian-client tasks.</p> <p>2. An internal error occurred within an Historian task.</p>	<p>1. Shut down all Historian-client tasks running on the system. Next, shut down the Historian. Then, start Historian followed by all other Historian-client tasks.</p> <p>2. Contact Customer Support.</p>
12	An Historian-client task passed an invalid Historian statement handle to an Historian.	<p>1. The Historian task was terminated before other Historian-client tasks.</p> <p>2. An internal error occurred within an Historian task.</p>	<p>1. Shut down all Historian-client tasks running on the system. Next, shut down the Historian. Then, start Historian followed by all other Historian-client tasks.</p> <p>2. Contact Customer Support.</p>
14	Historian-client task operation failed because the Historian disabled the connection to the database.	The FactoryLink application has disabled the connection to the database by setting the Historian Disable/Enable tag.	Enable the Historian Disable/Enable tag to perform this operation.

Table 120-1 Error Codes Generated While Communicating to an Historian Task

Code	Error	Cause	Action
16	An SQL operation is not supported.	An Historian-client task has used an SQL feature not supported by the Historian.	If using dBASE IV, consult the chapter on SQL limitations for the dBASE IV Historian. If other Historian, see the Historian log file for the SQL statement and then consult appropriate user's manual.
17	Historian database error.	This is a general error code for the Historian. The error text string may contain more information. This code is accompanied by various descriptive messages.	Read the accompanying message displayed on the Run-Time Manager screen or in the .LOG file and attempt to correct the problem based on that message's instructions.
18	Unknown function request sent to historian	An internal error occurred within an Historian-client task..	Contact Customer Support.
19	Tried to insert a duplicate row.	INSERT operation caused a UNIQUE constraint error on the database table.	No action required.
20	Table exists, tried to create a table that already exists.	CREATE TABLE operation failed because the table name already exists in the database.	No action required.
22	Table does not exist.	You tried to access a table that does not exist in database.	No action required.

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Table 120-1 Error Codes Generated While Communicating to an Historian Task

Code	Error	Cause	Action
23	Field does not exist.	You tried to access a field that does not exist in database table.	No action required.

Start-up Messages

This section explains errors that occur at start up with an Historian. Refer to the Historian's .log file to display the complete message.

Bad CT record size in CT archive *filename*

Cause: The archive file *HIST.CT is corrupt.

Action: Delete the archive file *HIST.CT. Restart the application to rebuild the archive file.

Bad CT type in CT archive *filename*

Cause: The archive file *HIST.CT is corrupt.

Action: Delete the archive file *HIST.CT. Restart the application to rebuild the archive file.

Bad hist. mailbox in CT archive *filename*

Cause: The file *HIST.CT contains an invalid element name for a mailbox element.

Action: Open the Configuration Manager Main Menu and choose the appropriate Historian. Delete the invalid element name from the Historian Mailbox Information panel and enter a valid element name.

Can't open CT archive *filename*

Cause: Either the archive file *HIST.CT does not exist or is corrupt.

Action: Delete it if the file exists. Restart the application to rebuild the archive file.

Can't open .LOG file

Cause: The Database Logging task can not open a .LOG file.

Action: Ensure the FLAPP/LOG directory exists.

Can't read record in CT archive *filename*

Cause: The archive file *HIST.CT is corrupt.

Action: Delete the archive file *HIST.CT. Restart the application to rebuild the archive file.

Duplicate mailboxes in CT archive *filename*

Cause: The Historian Mailbox Information panel contains duplicate mailbox elements.

Action: Open the Configuration Manager Main Menu and choose the appropriate Historian. Delete the duplicate entry in the Historian Mailbox Information panel.

Invalid # *number* of CT types in CT archive *name*

Cause: The archive file *HIST.CT is corrupt.

Action: Delete the archive file *HIST.CT. Restart the application to rebuild the archive file.

No CTs in CT archive *filename*

Cause: The Historian Table is not configured.

Action: Open the Configuration Manager Main Menu, choose Historian, and complete the Historian table.

No dbases defined in CT archive *filename*

Cause: The Historian Information panel is not configured.

Action: Open the Configuration Manager Main Menu, choose the appropriate Historian, and complete the Historian Information panel.

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No mailboxes in CT archive *filename*

Cause: The Historian Mailbox Information panel is not configured.

Action: Open the Configuration Manager Main Menu, choose the appropriate Historian, and complete the Historian Mailbox Information panel.

Out of RAM

Cause: Not enough RAM to run this task.

Action: Restart the task. If it fails again, allocate more RAM for this task or install more RAM.

SQLERROR: Can't *function* for task *task_name* due to error: *error*

Cause: An SQL error occurred during the execution of an SQL statement for a FactoryLink task. This error may originate with that FactoryLink task or with the Historian task.

Action: Refer to the user manual for the database in use for instructions for correcting this error.

SQLERROR: Can't *function* serial id with SQL statement: *sql_statement* for task *task_name* due to error: *error*

Cause: An SQL error occurred during the execution of an SQL statement for a FactoryLink task. This error may originate with that FactoryLink task or with the Historian task.

Action: Refer to the user manual for the database in use for instructions for correcting this error.

Error Messages Recorded in Historian Log Files

This section contains error messages written to an Historian .log file.

SQLERROR: Can't *sql_function* SQL statement *sql_statement* for task *task_name* due to error: *error*

Cause: An SQL error occurred during the execution of an SQL statement for a FactoryLink task. This error may originate with that FactoryLink task or with the Historian task.

Action: Refer to the documentation for the database in use for instructions for correcting this error.

SQLERROR: Can't *function* unique index: *unique_index* for task *task_name* due to error: *error*

- Cause:** An SQL error occurred during the execution of an SQL statement for a FactoryLink task. This error may originate with that FactoryLink task or with the Historian task.
- Action:** Refer to the documentation for the database in use for instructions for correcting this error.

Task initialization failed

- Cause:** The Historian task is installed incorrectly.
- Action:** Reinstall FactoryLink.

ODBC Driver and Data Source Messages

This section explains messages that can occur during the running of the ODBC Historian. ODBC messages can come from the following:

- Driver manager
- Database manager
- ODBC driver
- The driver manager is a DLL that establishes connections with drivers, submits requests to drivers, and returns results to applications. An error that occurs in the driver manager has the following format:

[vendor][ODBC DLL]message

where

vendor Is Microsoft.

- An error that occurs in the database system includes the database name. For example, you might get the following message from an Oracle data source:

[Microsoft][ODBC XXX driver][XXX]message

If you get this type of error, you have attempted to do something incorrectly with the database system. Check your system documentation for more information or consult your database administrator.

- An error that occurs in an ODBC driver has the following format:

[Microsoft][ODBC XXX driver]message

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Math & Logic

Procedures

Math & Logic executes procedures containing logically grouped and organized statements that have a single continuous thread of execution, or control flow, between the decision points (branches). Typically, you analyze the actions needed in the application and organize the operations needed for each action into one or more procedures. At run time, procedures can be either:

- Triggered in response to changes in the real-time database
- Executed directly from within another Math & Logic procedure

One or more procedures are contained within an editable plain-text program file. A program (.PRG) file can contain several separate procedures that may call (or refer to) one another.

Creating Programs

You must first create a program by configuring the following tables in order to use Math & Logic:

- Math and Logic Variables table—Defines Real-Time Database elements Math & Logic reads or writes to.
- Math and Logic Triggers table—Defines the elements used to trigger the Math & Logic procedures to run.
- Math and Logic Procedure table—Writes the Math & Logic procedures required by the application.

Modes

Math & Logic runs in one of two modes: Interpreted and Compiled.

Interpreted Mode

Interpreted mode is a subset of Compiled Math & Logic. IML means when the values of trigger elements associated with one or more procedures change in the real-time database, IML determines which procedures are affected. Math & Logic

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then interprets every line of the instructions and executes them for each triggered change. IML is excellent for application prototyping and logic debugging.

Most applications written in the Interpreted Mode function with no or very few modifications under the Compiled Mode. If an application running in Interpreted Mode uses any reserved words as variables or procedure names, these will need to be modified so the compiler will be able to compile and link the procedures error free. These words include any reserved by the C compiler for the platform you are running on as well as those reserved by FactoryLink.

Compiled Mode

Compiled mode is a combination of several FactoryLink utilities with a third party ANSI C language compiler working together to generate ANSI C code from user created *.prg files.

In CML, the procedure program file is translated into C source code that is compiled to create a binary executable file for the platform on which the application is developed. Because the application consists of both the SHARED and USER domains, CML creates two executable files, one for each domain. These executables are unique and are named:

- For SHARED domain:/{FLAPP}/SHARED/CML/CSHARED.EXE
- For USER domain:/{FLAPP}/USER/CML/CUSER.EXE

These files perform the same actions described in the program file when the associated trigger elements are set. CML increases the speed and functionality of applications that use IML.

Triggering/Calling

You can both trigger and call procedures.

Trigger Procedure: If you want to wait until one procedure has completed before executing another or if your procedure has to execute when an event occurs, trigger a new procedure.

Calling Procedure: If you want a procedure to occur immediately, you must call the procedure.

ERROR MESSAGES

Math & Logic maintains a message log file only for IML error messages issued during FactoryLink execution. A copy of this log file is maintained in a log subdirectory under either the SHARED or the USER domain directory associated with FLAPP (the application environment variable.) You can view the log file with any ASCII text editor.

The following Math & Logic error messages can be displayed on the Run-Time Manager screen, depending on the mode (IML or CML) the task is being run in. The mode each message is displayed in is indicated below the message.

All references to the Math & Logic .CT files include the following files:

/FLAPP/SHARED/CT/IML.CT

/FLAPP/USER/CT/IML.CT

/FLAPP/CT/IML.CT

The .CT files are named IML.CT regardless of the mode used (IML or CML).

Array access out of range

Mode: IML and CML

Cause: An array index has become too large or too small (probably inside a loop where it is being repeatedly incremented or decremented) and is now indexing outside the defined boundaries of the array.

Action: Choose Math and Logic Procedures from the Configuration Manager Main Menu. Open the appropriate program file and edit the procedure so the specified index is within the range of the declared array.

Assignment to Unknown Type

Mode: CML

Cause: The operating system, third-party software, or hardware setup on your system is incorrect or incompatible or an internal error occurred.

Action: Verify the following:

1. The operating system is set up to run FactoryLink (tuning parameters, resources).

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2. All third-party software needed by FactoryLink, such as X-Windows, is installed and set up correctly and you have the correct version for FactoryLink.

3. All hardware is correctly set up and all of the hardware is compatible.

Contact Customer Support if everything is set up correctly and is compatible and the error continues to occur.

Bad tag array index

Mode: CML

Cause: You specified an index not within the bounds of an array, or made reference to an element as an array not defined as an array.

Action: Open the Math and Logic Variables Information panel and ensure elements required to be arrays are defined as arrays in the Tag Name column. If an undefined index is specified, either specify an index within the currently defined array or delete the element name from the Math & Logic Variables Information panel and redefine the element with a new array.

Can't get FactoryLink ID = *number*

Mode: CML

Cause: Either the FactoryLink real-time database is not running or the task name is not listed correctly in the System Configuration table.

Action: Either correct the task name in the System Configuration table or start the Run-Time Manager.

Can't locate MATH keyword file

Mode: IML and CML

Cause: The file IMLTOKEN.KEY, normally found in the /FLINK/KEY directory, does not exist or cannot be opened. The installation program may not have completed successfully or the file may have been damaged.

Action: Ensure IMLTOKEN.KEY exists. Reinstall the FactoryLink software if it exists in the appropriate directory and the problem is not solved. Back up any applications prior to reinstallation.

Can't open Compiled Math and Logic makefile: *filename***Mode:** CML

Cause: The MAKE file is missing.

Action: Reinstall the FactoryLink software.

CML executable missing**Mode:** CML

Cause: A compilation or a link error a syntax error caused in one of the .PRG files occurred.

Action: Check the .PRG files for syntax errors.

Compiled Math and Logic is not authorized within the software protection key**Mode:** CML

Cause: The Compiled Math & Logic option was not purchased.

Action: Purchase the CML option.

Compiled Math and Logic link module missing**Mode:** CML

Cause: A module named in the MAKE file does not exist.

Action: Remove the references to the nonexistent module from the MAKE file.

Compiled Math and Logic source file *.c file* is missing**Mode:** CML

Cause: A file named in the MAKE file does not exist.

Action: Remove the references to the nonexistent module from the MAKE file.

Corrupt configuration table index**Mode:** IML and CML

Cause: The Math & Logic .CT files are damaged.

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Action: Delete the files. Restart the application to rebuild the .CT files.

Corrupt data in configuration file

Mode: CML

Cause: The Math & Logic .CT files are damaged.

Action: Delete the files. Restart the application to rebuild the .CT files.

CT filename size incorrect. Struct size CT size

Mode: CML

Cause: The Math & Logic .CT files are damaged.

Action: Delete the files. Restart the application to rebuild the .CT files.

CTGEN returned a FAILURE status - exiting MKCML

Mode: CML

Cause: CTGEN returned an error during compilation or linking to an executable.

Action: Check the .PRG files and run MKCML again. Contact Customer Support if the error still occurs.

Database read error

Mode: IML and CML

Cause: An error occurred while Math & Logic was reading either the value of an element or its change-status flag from the FactoryLink real-time database. The operating system, third-party software, or hardware setup on your system is incorrect or incompatible or an internal error occurred.

Action: Verify the following:

1. The operating system is set up to run FactoryLink (tuning parameters, resources).
2. All third-party software needed by FactoryLink, such as X-Windows, is installed and set up correctly and you have the correct version for FactoryLink.
3. All hardware is correctly set up and all of the hardware is compatible.

Contact Customer Support if everything is set up correctly and is compatible and the error continues to occur.

Database write error

Mode: IML and CML

Cause: An error occurred while Math & Logic was writing either a new value into an element or when resetting its change-status flag in the FactoryLink real-time database. The operating system, third-party software, or hardware setup on your system is incorrect or incompatible or an internal error occurred.

Action: Verify the following:

1. The operating system is set up to run FactoryLink (tuning parameters, resources).
2. All third-party software needed by FactoryLink, such as X-Windows, is installed and set up correctly and you have the correct version for FactoryLink.
3. All hardware is correctly set up and all of the hardware is compatible.

Contact Customer Support if everything is set up correctly and is compatible and the error continues to occur.

Division by zero

Mode: IML and CML

Cause: The program encountered an attempt to divide a value by zero or to perform an operation directly or indirectly resulting in division by zero with the result undefined.

Action: Choose Math and Logic Procedures from the Configuration Manager Main Menu. Open the appropriate program file and edit the procedure to divide by a value other than zero.

Note: Usually, this is an inadvertent result of an array or loop index being decremented out of control or the result of not testing operator input used as a divisor.

Environment table full - unable to add variable

Mode: CML

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Cause: Not enough space exists in the operating system shell to set the environment variables.

Action: Increase the environment space in the operating system shell. Refer to the documentation for the operating system for information.

EOF in codef

Mode: IML and CML

Cause: The task found an end of file character in the code array for this program before one was expected (for example, before the logical end of a program). The operating system, third-party software, or hardware setup on your system is incorrect or incompatible or an internal error occurred.

Action: Verify the following:

1. The operating system is set up to run FactoryLink (tuning parameters, resources).
2. All third-party software FactoryLink needs, such as X-Windows, is installed and set up correctly and you have the correct version for FactoryLink.
3. All hardware is correctly set up and all of the hardware is compatible.

Contact Customer Support if everything is set up correctly and is compatible and the error continues to occur.

Error occurred compiling file: *filename*

Mode: CML

Cause: The named file caused an error in the compile process.

Action: Check the file for syntax errors.

Error occurred creating linker response file

Mode: CML

Cause: Memory allocation error.

Action: Check the amount of memory.

Error occurred spawning application's CML executable**Mode:** CML

Cause: An error occurred in the compile process that prevented the creation of the CML executable.

Action: Check /FLAPP/SHARED/CML/CSHARED.EXE and /FLAPP/USER/CML/CUSER.EXE. Type the following command to rebuild the CML executables:

MKCML -C

Error occurred writing to linker response file**Mode:** CML

Cause: Memory allocation error.

Action: Check the amount of memory.

Error opening generation output file(s)**Mode:** CML

Cause: An error occurred while attempting to convert .PRG files to .C files.

Action: Ensure the path name is valid and enough disk space is on the specified drive.

Error reading configuration table header**Mode:** CML

Cause: The Math & Logic .CT files are damaged.

Action: Delete the files. Restart the application to rebuild the .CT files.

Error reading procedure config. record**Mode:** IML and CML

Cause: The Math Logic .CT files are damaged.

Action: Delete the files. Restart the application to rebuild the .CT files.

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Error reading tag config. record

Mode: IML and CML

Cause: The Math & Logic .CT files are damaged.

Action: Delete the files. Restart the application to rebuild the .CT files.

Error reading trigger config. record

Mode: IML and CML

Cause: The Math & Logic .CT files are damaged.

Action: Delete the files. Restart the application to rebuild the .CT files.

Error while reading DOMAIN.CT

Mode: CML

Cause: The DOMAIN.CT file in /FLAPP/FLDOMAIN/CT directory is damaged.

Action: Delete the file. Restart the application to rebuild the .CT file.

Executable *filename* not found - exiting MKCML

Mode: CML

Cause: The system was started with the FLRUN command, which calls MKCML. MKCML could not find the executableCML.EXE because it was not created.

Action: Invoke the MKCML utility, which creates CML.EXE, by entering the following command at the system prompt:

MKCML

Executable *filename* returned a FAILURE status - exiting MKCML

Mode: CML

Cause: The creation of the CML.EXE aborted because a program file has errors.

Action: Check the .PRG files so they validate with no errors from MKCML. Contact Customer Support if there are errors.

FactoryLink environment variables are not set properly**Mode:** CML

Cause: You did not set the FLINK and/or FLAPP environment variables.

Action: Set FLINK to the full path of the FactoryLink program files and set FLAPP to the full path of the application files.

Float domain error in *function name arg1, arg2***Mode:** IML and CML

Cause: IML: The specified argument to a floating-point operation is not within acceptable range.

CML: Look in the section for Math Library Functions in the documentation supplied with your compiler for information about the cause of this error.

Action: IML: Choose Math and Logic Procedures from the Configuration Manager Main Menu. Open the file containing the named procedure. Correct the problem in the floating-point operation.
CML: Look in the section for Math Library Functions in the documentation supplied with your compiler for information about the action for this error.

Float exception in *procedure name arg1, arg2***Mode:** IML

Cause: A problem occurred in a floating-point operation in the specified procedure.

Action: Choose Math and Logic Procedures from the Configuration Manager Main Menu. Open the file containing the named procedure. Correct the problem in the floating-point operation.

Float overflow in *function name arg1, arg2***Mode:** IML and CML

Cause: IML: The specified value was greater than the maximum. (Often caused by inadvertent division by zero.)

CML: Look in the section for Math Library Functions in the documentation supplied with your compiler for information about the cause of this error.

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Action: IML: Choose Math and Logic Procedures from the Configuration Manager Main Menu. Open the file containing the named procedure. Correct the problem in the floating-point operation.
CML: Look in the section for Math Library Functions in the documentation supplied with your compiler for information about the action for this error.

Float singularity in *function name arg1, arg2*

Mode: IML and CML

Cause: IML: A problem occurred in a floating-point operation in the specified procedure.

Cause: CML: Look in the section for Math Library Functions in the documentation supplied with your compiler for information about the cause of this error.

Action: IML: Choose Math and Logic Procedures from the Configuration Manager Main Menu. Open the file containing the named procedure. Correct the problem in the floating-point operation.
CML: Look in the section for Math Library Functions in the documentation supplied with your compiler for information about the action for this error.

Float underflow in *function name arg1, arg2*

Mode: IML and CML

Cause: IML: The specified value was less than the minimum allowable (representable) floating-point value.
CML: Look in the section for Math Library Functions in the documentation supplied with your compiler for information about the cause of this error.

Action: IML: Choose Math and Logic Procedures from the Configuration Manager Main Menu. Open the file containing the named procedure. Correct the problem in the floating-point operation.
CML: Look in the section for Math Library Functions in the documentation supplied with your compiler for information about the action for this error.

Invalid argument: *arg***Mode:** CML

Cause: An incorrect command line switch is used with the MKCML utility command.

Action: The following command line switches are valid with the MKCML utility command:

P
A
U
N
V_x
C

Invalid data type**Mode:** IML and CML

Cause: The operating system, third-party software, or hardware setup on your system is incorrect or incompatible or an internal error occurred.

Action: Verify the following:

1. The operating system is set up to run FactoryLink (tuning parameters, resources).
2. All third-party software needed by FactoryLink, such as X-Windows, is installed and set up correctly and you have the correct version for FactoryLink.
3. All hardware is correctly set up and all of the hardware is compatible.

Contact Customer Support if everything is set up correctly and is compatible and the error continues to occur.

Invalid/missing domain specified**Mode:** CML

Cause: The specified domain is invalid.

Action: Contact Customer Support.

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Invalid stack variable

(Mode: IML and CML)

Invalid symbol type

(Mode: IML)

Cause: The operating system, third-party software, or hardware setup on your system is incorrect or incompatible or an internal error occurred.

Action: Verify the following:

1. The operating system is set up to run FactoryLink (tuning parameters, resources).
2. All third-party software needed by FactoryLink, such as X-Windows, is installed and set up correctly and you have the correct version for FactoryLink.
3. All hardware is correctly set up and all of the hardware is compatible.

Contact Customer Support if everything is set up correctly and is compatible and the error continues to occur.

Invalid tag dimensions in config. record

Mode: CML

Cause: Specified an index not within the bounds of an array, or made reference to an element as an array not defined as an array.

Action: Open the Math and Logic Variables Information panel and ensure elements required to be arrays are defined as arrays in the Tag Name column. If an undefined index was specified, either specify an index within the currently defined array, or delete the element's name from the Math and Logic Variables Information panel and redefine the element with a new array.

Invalid tag type

Mode: IML and CML

Cause: A variable is entered as a message or mailbox variable type.

Action: Change the variable type to one of the four allowed types: SHORT, LONG, FLOAT, or STRING.

Invalid token in code array**Mode:** IML and CML

Cause: An unrecognized instruction is found in the code array for this procedure.

Action: Contact Customer Support.

Invalid trigger

(**Mode:** IML)

Invalid variable block size

(**Mode:** IML)

Invalid variable type

(**Mode:** IML and CML)

Cause: The operating system, third-party software, or hardware setup on your system is incorrect or incompatible or an internal error occurred.

Action: Verify the following:

1. The operating system is set up to run FactoryLink (tuning parameters, resources).
2. All third-party software needed by FactoryLink, such as X-Windows, is installed and set up correctly and you have the correct version for FactoryLink.
3. All hardware is correctly set up and all of the hardware is compatible.

Contact Customer Support if everything is set up correctly and is compatible and the error continues to occur.

Keyword *keyword* used as constant**Mode:** IML and CML

Cause: The named keyword is used as the name of a variable or constant in a procedure.

Action: Substitute another name for this variable or constant within the procedure.

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- *Error Messages*
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Length of line too long

Mode: CML

Cause: A program line is too long to process.

Action: Break up the line into multiple lines.

Local index < 0

Mode: IML

Cause: The operating system, third-party software, or hardware setup on your system is incorrect or incompatible or an internal error occurred.

Action: Verify the following:

1. The operating system is set up to run FactoryLink (tuning parameters, resources).
2. All third-party software needed by FactoryLink, such as X-Windows, is installed and set up correctly and you have the correct version for FactoryLink.
3. All hardware is correctly set up and all of the hardware is compatible.

Contact Customer Support if everything is set up correctly and is compatible and the error continues to occur.

Lookup table is corrupt

Mode: IML

Cause: The task cannot find procedures because the table pointing to them is corrupted.

Action: End the run and restart it.

Missing or invalid keyword: *keyword*

Mode: CML

Cause: The MAKE file contains an invalid keyword.

Action: Correct the MAKE file.

Missing procedure: *procedure name***Mode:** IML

Cause: A program file exists with no procedure defined with the same name as the file or the current procedure attempted to call another procedure not defined or is not declared in the current program file.

Action: Verify all program files contain a main procedure with the same name as the program file. Verify the called procedure is declared in the current program file. If it is not, open the appropriate program file and define the procedure to be called.

filename* missing CML makefile keyword: *keyword**Mode:** CML

Cause: The MAKE file contains an invalid keyword.

Action: Correct the MAKE file.

MOD by zero**Mode:** IML and CML

Cause: The procedure attempted to perform a modulo operation resulting in division by zero with the result undefined.

Action: Choose Math and Logic Procedures from the Configuration Manager Main Menu. Open the appropriate program file and edit the procedure to use a value other than zero in the operation. Check for loop indices or accumulators used as divisors.

Multiple trigger entries**Mode:** IML

Cause: Multiple triggers are defined for the same Math & Logic procedure or the trigger files are corrupt.

Action: Choose Math and Logic Triggers from the Configuration Manager Main Menu. Correct the errors in the Math and Logic Triggers Information panel. Restart program execution.

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Nesting too deep

Mode: IML and CML

Cause: The nesting of the local procedure is too deep. The maximum depth for local procedure nesting is 32, unless limited by available memory constraints.

Action: Choose Math and Logic Procedures from the Configuration Manager Main Menu. Restructure the nesting of the procedure within the program file.

Nesting too shallow

Mode: IML

Cause: The nesting of the local procedure is not deep enough. This message usually indicates misnested logical structures, such as overlapping WHILE...WEND or IF...ENDIF statements.

Action: Choose Math and Logic Procedures from the Configuration Manager Main Menu. Open the procedures that contain nested statements and check their nesting structure. Correct any overlap errors.

No configuration tables defined

Mode: IML and CML

Cause: The Math & Logic .CT files in the /FLINK/CT directory have been damaged or no configuration table defined.

Action: If it exists, delete the file. Restart the application to rebuild the .CT files.

No tables configured for this task

Mode: IML and CML

Cause: The Math & Logic .CT files in the /FLINK/CT directory does not exist or cannot be opened. The installation may not have completed successfully or the file may have been damaged.

Action: Delete the file if it exists. Restart the application to rebuild the file.

No triggers are defined for this task**Mode:** IML and CML**Cause:** No triggers are defined for the Math & Logic task.**Action:** Choose Math and Logic Triggers from the Configuration Manager Main Menu. Define one or more triggers in the Math and Logic Triggers Information panel.**No variable name separator character =****Mode:** CML**Cause:** A syntax error is encountered in the MAKE file.**Action:** Correct the error and compile again.**Null procedure: *procedure name*****Mode:** IML and CML**Cause:** The current procedure attempted to call another procedure not defined or is in a program file that does not have a trigger defined in the Math and Logic Triggers Information panel.**Action:** Choose Math and Logic Triggers from the Configuration Manager Main Menu. Verify the appropriate program file has a trigger defined. If it does not, define a trigger for the program file. If the problem procedure is not defined, return to the appropriate program file and either define the procedure or remove all references to the procedure.**Options not installed for Compiled Math and Logic****Mode:** CML**Cause:** The task may not be loaded/configured because it is not in the master key. Installation may not have completed successfully, you may have entered the configuration sequence and/or authorization code incorrectly, or you may not have purchased the Compiled Math & Logic option.**Action:** Type the following command at the system prompt:
UKEY -LM
to list the contents of the master key. Check that the Compiled Math & Logic option is present. If the option is present, the

- **MATH & LOGIC**
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installation may not have completed successfully or you may have entered the configuration sequence or authorization code incorrectly. Either reinstall the system or reenter the configuration sequence and authorization code. Refer to the *Windows NT and Windows 95 Installation Guide* for more information. Contact your FactoryLink sales representative to purchase the Compiled Math & Logic option if it is not present.

Options not installed for Interpreted Math and Logic

Mode: IML

Cause: The task may not be loaded/configured because it is not in the master key. Installation may not have completed successfully.

Action: Type the following command at the system prompt:
 UKEY -LM
 to list the contents of the master key. Check that the Interpreted Math & Logic option is present. If the option is present, installation may not have completed successfully, and the system should be reinstalled.

Out of RAM

Mode: IML and CML

Cause: No more memory is available for the system to allocate to the task.

Action: Close any unnecessary windows or programs, such as the Application Editor, or any text editor. Add memory to the system if this occurs often.

Out of RAM keywords

Mode: IML and CML

Cause: Insufficient memory is available to run the Math & Logic task.

Action: Make more memory available to the system either by removing unnecessary software drains on system resources or by modifying the hardware.

Parsing error: see *procedure name*

Mode: IML

Cause: A parsing error occurred during program execution.

Action: Review the Math & Logic message log file for details about the error and take corrective action.

Partial loss of significance in *procedure name arg1, arg2*

Mode: IML and CML

Cause: IML: A problem occurred with numeric representation causing loss of significance in a numeric value during execution of the specified procedure.

CML: Look in the section for Math Library Function in the documentation supplied with your compiler for information about the cause of this error.

Cause: IML: Choose Math and Logic Procedures from the Configuration Manager Main Menu. Open the file containing the named procedure. Correct the problem in the floating-point operation.

CML: Look in the section for Math Library Function in the documentation supplied with your compiler for information about the action for this error.

Procedure *procedure name* does not exist

Mode: IML and CML

Cause: A program file exists with no procedure defined with the same name as the file.

Action: Verify all program files contain a main procedure with the same name as the program file. Ensure the case (upper, lower, or mixed-case) of the file name agrees with the case of the name in the file.

Procedure multiply defined

Mode: IML and CML

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Caution: Two procedures in the same or different program files are defined with the same name (remember: file names in Math & Logic are case-sensitive) or a variable, constant, or element is defined with a name already used.

Action: Change the name of one of these procedures or variables so no two procedures have the same name.

Record size error

(Mode: IML)

Run-time error in proc *procedure name*, Line *line number*: *message*

(Mode: IML)

Run-time error in proc *procedure name*: *message*

(Mode: CML)

Stack overflow

(Mode: IML and CML)

Stack underflow

(Mode: IML and CML)

Cause: The operating system, third-party software, or hardware setup on your system is incorrect or incompatible or an internal error occurred.

Action: Verify the following:

1. The operating system is set up to run FactoryLink (tuning parameters, resources).
2. All third-party software needed by FactoryLink, such as X-Windows, is installed and set up correctly and you have the correct version for FactoryLink.
3. All hardware is correctly set up and all of the hardware is compatible.

Contact Customer Support if everything is set up correctly and is compatible and the error continues to occur.

Tag array mismatch**Mode:** CML

- Cause:** The array is defined to have x dimensions, but is referenced as having more or fewer dimensions than defined.
- Action:** Choose the Configuration Manager Main Menu. Choose Object List from the View menu. The RTDB Element List panel is displayed. Search for the array name in the Tag field and check the array dimensions in the Dimension column. Reference the array accordingly.

Tag type does not match**Mode:** IML

- Cause:** An element name is declared in a Math & Logic procedure with a type different from the defined element name.
- Action:** Change the type of the defined element name. This requires deleting the defined element name and all occurrences of that element name and then redefining the element name with the correct type.
- Use the Object List option from the Configuration Manager Main Menu to check the element data type and use the X-Ref (Cross-Reference) List option to find all references to that element.

Too many global variables**Mode:** IML and CML

- Cause:** Too many global variables are declared in the specified procedure.
- Action:** Choose Math and Logic Procedures from the Configuration Manager Main Menu. Open the appropriate program file(s) and remove or combine some of the variables.

Too many local variables**Mode:** IML

- Cause:** Too many local variables are declared in the specified procedure.

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Action: Choose Math and Logic Procedures from the Configuration Manager Main Menu. Open the appropriate program file(s) and declare some of the variables outside of the procedures.

TOS overflow

Mode: IML and CML

Cause: The operating system, third-party software, or hardware setup on your system is incorrect or incompatible or an internal error occurred.

Action: Verify the following:

1. The operating system is set up to run FactoryLink (tuning parameters, resources).
2. All third-party software needed by FactoryLink, such as X-Windows, is installed and set up correctly and you have the correct version for FactoryLink.
3. All hardware is correctly set up and all of the hardware is compatible.

Contact Customer Support if everything is set up correctly and is compatible and the error continues to occur.

Total loss of significance in *procedure name arg1, arg2*

Mode: IML

Cause: **IML:** A problem occurred with significance (proper representation of the entire value) in a numerical operation in the specified procedure.

CML: Look in the section for Math Library Functions in the documentation supplied with your compiler for information about the cause of this error.

Action: **IML:** Choose Math and Logic Procedures from the Configuration Manager Main Menu. Open the file containing the procedure. Correct the problem with the numerical operation.

CML: Look in the section for Math Library Functions in the documentation supplied with your compiler for information about the action for this error.

Trigger size error

Mode: IML

Cause: The operating system, third-party software, or hardware setup on your system is incorrect or incompatible or an internal error occurred.

Action: Verify the following:

1. The operating system is set up to run FactoryLink (tuning parameters, resources).
2. All third-party software needed by FactoryLink, such as X-Windows, is installed and set up correctly and you have the correct version for FactoryLink.
3. All hardware is correctly set up and all of the hardware is compatible.

Contact Customer Support if everything is set up correctly and is compatible and the error continues to occur.

Unable to set current working directory to: *directory name*

Mode: CML

Cause: Invalid directory specified.

Action: Specify the directory set in the FLAPP environment variable.

Undefined identifier

(**Mode:** IML)

Unknown tag type

(**Mode:** CML)

Cause: The operating system, third-party software, or hardware setup on your system is incorrect or incompatible or an internal error occurred.

Action: Verify the following:

1. The operating system is set up to run FactoryLink (tuning parameters, resources).
2. All third-party software needed by FactoryLink, such as X-Windows, is installed and set up correctly and you have the correct version for FactoryLink.
3. All hardware is correctly set up and all of the hardware is compatible.

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Contact Customer Support if everything is set up correctly and is compatible and the error continues to occur.

Wrong type

Mode: IML and CML

Cause: You declared a local or global variable with a data type invalid for the operation. Valid data types for variables are SHORT, LONG, FLOAT, and STRING; valid data types for operands are shown in the descriptions of various operators.

Action: Choose Math and Logic Procedures from the Configuration Manager Main Menu. Open the appropriate program file and edit the variable declaration to contain a valid data type.

Persistence

Use the Persistence task to save the values of an activeFactoryLink application at predetermined times so if FactoryLink is shut down unexpectedly, useful data is not lost. Then, when you restart FactoryLink with the warm start command-line option, the Run-Time Manager restores the last save of the real-time database from the persistence save file.

PERSISTENCE OVERVIEW

The memory-based real-time database represents the current state (values) of elements. The real-time database is a collection of domain instances. Elements in the database may have default values which are placed into the domain instance when it is initialized.

The values of the elements in a domain instance are lost when the domain instance is closed. When the domain instance is opened again, its elements are initialized to their default values.

Persistence is the ability of an element to maintain its value over an indefinite period of time. Non-persistent elements lose their value when the Run-Time Manager exits and shuts down the real-time database. However, the values of persistent elements are written to disk so they are not affected when the real-time database shuts down.

The job of the Persistence task, therefore, is to save persistent data.

Principles of Operation

Persistence begins during application development. Whether configuring a new application or reconfiguring an existing application, you must first determine which elements are persistent, when the values of the persistent elements are saved to disk, and how these saved values are restored during a warm start. Then, specify this information on the Tag Definition when defining a persistent element.

At run time, the Persistence task saves the values of the persistent elements to its own internal disk cache and the task writes the data to disk from there. Saving the persistent values to memory first increases processing speed and ensures all values meant to be saved are saved within the allotted time.

- **PERSISTENCE**
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The Persistence task runs under each domain that requires persistent data to be saved. The RESOLVE program (executed by the FLRUN command) creates a blank persistence save file for each domain the first time it is executed. During its initialization, the Persistence task loads the persistence save file to determine which elements in the application are persistent and when the values of those elements are to be saved. It also loads the PERSIST.CT file to get specific information about the configuration of the Persistence task itself.

When you perform a warm start, the current domain's Run-Time Manager restores the domain instance's real-time database from the persistence save file. It restores the values of the persistent elements to the last values saved by Persistence.

To perform a warm start of FactoryLink, use the warm start argument **-w**. In Windows and OS/2, add the **-w** to the command line for the icon used to start FactoryLink; in UNIX, either pass the **-w** to the FLRUN command, or add it to the line in the script file used to start FactoryLink.

Resolving Configuration Changes

After you shut down a FactoryLink application, you might reconfigure part of the application using the Main Menu or the Application Editor. This means the elements and their values stored in the persistence save file either may not exist or might not have the same data type when you restart the application. Before each FactoryLink session is restarted, the element names stored in the persistence save file must be checked for changes against the OBJECT.CT and the DOMAIN.CT files.

This resolving of configuration changes is done by the RESOLVE.EXE (resolve on UNIX systems) program. The FLRUN command automatically executes this program before it starts the Run-Time Manager for a particular FactoryLink session.

The RESOLVE program serves three purposes.

- Creates the blank persistence save file the first time it is run.
- Manages the changes between the persistence save file and the FactoryLink configuration files.
- Determines if the persistence save file is usable and, if not, the program looks for and uses the persistence backup file.

PERSISTENCE SAVE INFORMATION PANEL

Perform the following steps to configure the Persistence Save Information panel:

- 1 Ensure the domain selected is correct in the Configuration Manager Domain Selection box.
- 2 Choose Persistence in the Configuration Manager Main Menu to display the Persistence Save Information panel.

Timed Save Trigger	Cache Buffers	Buffer Size	Message Copy Size

Cancel Enter Exit

- 3 Specify the following information for this panel:

Timed Save Trigger Name of an element used to trigger a timed save of the values of all elements marked as persistent by time.

When the element defined here is triggered at run time, the Persistence task reads all elements in the current domain instance configured to be saved on a timed basis and writes their values to disk (the persistence save file).

Leave this field blank if no timed saves are required for the application.

Valid Entry: standard tag name

Valid Data Type: digital, analog, longana, float, message

Cache Buffers Number between 0 and 32766 indicating the number of buffers to be set aside for the Persistence task internal disk cache. The default is 16. Use the following guidelines to determine the number of buffers.

- **PERSISTENCE**

- *Persistence Save Information Panel*

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- How often the data changes
- How much of the data changes
- The size of the data that changes

No disk caching happens if you enter 0. This can be desirable if the operating system itself uses an efficient disk caching system , such as UNIX.

Valid Entry: numeric value of up to 32766 (default = 16)

Buffer Size Number between 64 and 32766 indicating the size, in bytes, of each buffer in the cache. The default is 512.

Valid Entry: numeric value of between 64 and 32766 (default = 512)

Message Copy Size Number between 80 and 32,766 indicating the maximum length allowed for message elements during persistent saves. FactoryLink uses the number entered here when it reads elements from the real-time database, and when restoring values during a warm start.

Valid Entry: numeric value of between 80 and 32766 (default = 2048)

Backup Trigger Name of an element used to trigger a backup of the current persistent save file.

At run time, when the application triggers the element defined here, the Persistence task copies the current persistence save file to a backup file.

Valid Entry: standard tag name

Valid Data Type: digital, analog, longana, float, message

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

PERSISTENCE MESSAGES

One of the following messages may be displayed next to PERSIST on the Run-Time Manager screen if an error occurs with Persistence at run time.

Can't get a task ID for %s

Cause: Could not connect to a running FactoryLink application.

Action: Ensure the application is running, then try again.

Can't open the file or the /FLAPP/CT/PERSISTENCE.CT file does not exist or is corrupt.

Action: If the file exists, delete it and restart the application to recreate the file. If the file does not exist, create it by restarting the application.

Can't use backup save file

Cause: If the RESOLVE program cannot use the persistence save file (*.PRS) because it is corrupted, the program looks for the persistence backup file (*.BAK). If RESOLVE cannot use the .BAK file, it generates this message.

Action: Delete the original save and backup files and the task creates new save file and a new backup file.

Error deleting the file:

Cause: The specified file cannot be deleted. Another developer may be using it or the file is read-only.

Action: Check to see if the file is being opened by another developer or if the file is read-only.

Error getting FLINK environment variables

Cause: The variables FLDOMAIN, FLNAME, and FLUSER are not defined.

Action: Define the variables from the system prompt using the following format:

```
set (flvar)=(flvardef)
```

- **PERSISTENCE**
- *Persistence Messages*
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where

`flvar` is the FactoryLink environment variable `FLDOMAIN`, `FLNAME`, or `FLUSER`.

`flvardef` is the developer-defined name for this variable.

Error reading CT file: *filename*

Cause: Either the file `/CT/PERSISTENCE.CT` is corrupt, or the `.CT` script file (`/FLINK/CTG/PERSISTENCE.CTG`) and the FactoryLink Run-Time version are not of the same version.

Action: Delete the file `/FLAPP/CT/PERSISTENCE.CT`. Restart the application to rebuild the file.

Error reading persistence file: *filename*

Cause: Either the file is corrupt or the disk is damaged.

Action: Inspect the file. Run `CHKDSK` or any disk diagnostic program to locate problems with the disk drive.

Error reading RTDB: %d

Cause: You tried to read an element value from the database and the kernel returned this message with an error number.

Action: Shut down and restart the application and try to read the value again.

Error seeking in file: *filename*

Cause: Either a hardware error or a corrupted system exists.

Action: Contact Customer Support.

Error writing to file: *filename*

Cause: Either a hardware error or a corrupted system exists.

Action: Contact Customer Support.

Invalid CT file structure in: *filename*

Cause: The specified .CT file is corrupted.

Action: Run `ctgen -r` to rebuild the .CT files and try again.

Invalid or corrupt save file

Cause: The persistence save file (*.PRS) is corrupt. The task looks for and attempt to use the persistence backup file (*.BAK).

Action: No action required - information message only.

Out of RAM

Cause: Not enough RAM available to perform this task.

Action: Close any unnecessary windows or programs, such as the Application Editor or any text editor. Add RAM to the system if this error message occurs often.

%s is not a FactoryLink persistence file

Cause: The specified file is not in the persistence save file format and does not have a .PRS extension.

Action: Remove the offending file. If the persistence backup file (*.BAK) exists, copy it to the save file with a .PRS extension.

Save file was not closed properly

Cause: The task generates this message when it begins to copy the persistence backup (*.BAK) file on the persistence save (*.PRS) file.

Action: No action required - information message only.

Task Initialization failed

Cause: The Persistence task is already running, a key is not installed, the wrong key is installed, or you are not authorized to have the key.

Action: Check that the proper key is installed if you are authorized to have the key.

- **PERSISTENCE**
- *Persistence Messages*
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PowerNet

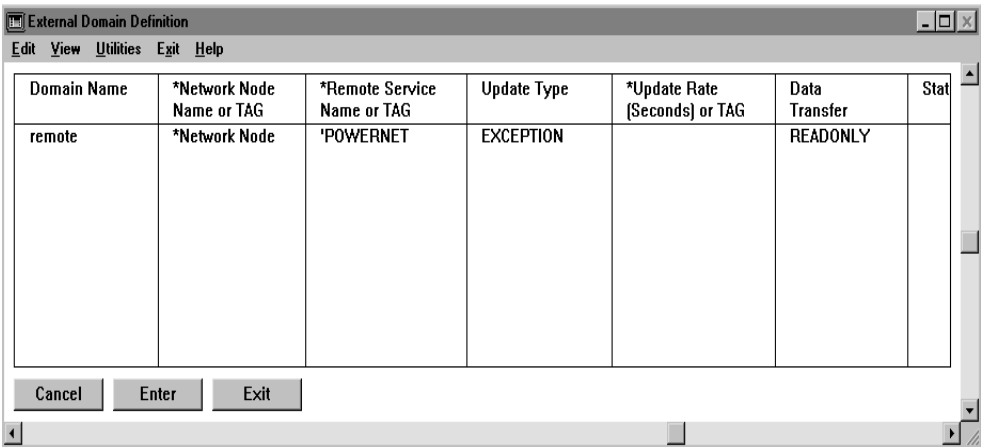
Data collected or computed by FactoryLink is stored in data elements in the real-time database. Tag names defined in the Application Editor or in Configuration Manager panels identify these elements. Real-time database elements can be shared among FactoryLink applications running on the same or a different workstation (node) using PowerNet.

One FactoryLink application can act as a client/server. This application can serve other FactoryLink applications by providing needed information. As a client, the application can use information provided by other FactoryLink applications.

On platforms where FactoryLink supports multiple applications running on the same computer, you can run multiple instances of PowerNet. See *FactoryLink Fundamentals* for a discussion of multiple-user environments.

Using PowerNet with the FLDEMO Application

The following entries must be made in the External Domain Definition panel in the Configuration Manager to use PowerNet with the FLDEMO application provided with FactoryLink.



- **POWERNET**
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In the FLDEMO application, the PowerNet task is not automatically started. Start PowerNet from the Run Manager screen or add the R flag to the task in the System Configuration panel.

Method of Data Transfer

This section describes what initiates data transfer between a server application and a client application.

Startup

As each client attaches to a server application, all of the data shared between the server and client applications is transmitted from the server to the client. This ensures the client contains up-to-date data immediately upon starting up. This also occurs at reconnection in the event a connection is lost between the client and server.

Server-to-Client Data Transfer

Data transfer from the server to the client is configured by one of the following two methods:

- **Exception Data**—Transmits data to the client only when data has changed in the server application.
- **Polled Data**—Transmits data to the client on a fixed interval, a dynamic interval, or at any event the client application generates.

Client-to-Server Data Transfer

A data connection to an external domain may be configured as read only (the default) or read/write. Read/write connections allow data that has changed in the client application to be written back to the server application.

Domains that include mailbox tags should be READONLY, not READWRITE. If a domain containing a mailbox tag is READWRITE, PowerNet will ignore the mailbox tag in the write-back connection. The task will still run, but PowerNet will print the warning message Mailbox tag *tagname* is ignored in the write-back domain (see page 313).

Tag Naming Conventions

Tag names referencing data elements from other applications use the following format.

exdomain:tagname{[sub1] {[sub2],...}}

Tag Type Conversion

Tags that reference data in a remote application can be of a different data type from the tag definition in the remote application.

EXTERNAL DOMAIN DEFINITION PANEL

Perform the following steps to configure the External Domain Definition panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose External Domain Definition in the Configuration Manager Main Menu to display the External Domain Definition panel.

Domain Name	*Network Node Name or TAG	*Remote Service Name or TAG	Update Type	*Update Rate (Seconds) or TAG
NODEB NADEC	netnod_name 'NODEC	remserv_name 'POWERNT2	POLLED EXCEPTION	up_rate_ana 0

Buttons: Cancel, Enter, Exit

- 3 Specify the following information for this panel:

Domain Name Name of the external domain. Use this name as part of the remote tag reference. For example, NODEB:temp. Refer to the *Configuration Guide* for details on tag naming conventions. This logical representation of a FactoryLink application is limited to eight characters. This example client application is accessing information from two logical server applications, NODEB and NODEC.

Valid Entry: domain name

- **POWERNET**

- *External Domain Definition Panel*

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***Network Node Name or TAG** Node name where the FactoryLink server application represented by this connection resides. This name can either be a constant preceded by a single quote or a tag name.

If you enter a constant, the constant should be a valid TCP/IP host name. Refer to *Configuration Guide* for more details. If this field references the local node, PowerNet performs local tag value transfers.

Valid Entry: standard tag name or constant

Valid Data Type: message

***Remote Service Name or TAG** Name of the service used by the server application represented by this connection. This name can either be a constant preceded by a single quote or a tag.

If you enter a constant, the name must match the name assigned to the instance of PowerNet used by the server application as defined in the TCP/IP services file. Refer to the *Configuration Guide* for more details.

If you leave this field blank, POWERNET is assumed as the services name.

Valid Entry: standard tag name or constant

Valid Data Type: message

Update Type Method data is sent from the server application to the client application by. This can be one of the following:

EXCEPTION Transfers data when tag change status bits are set. This is the default.

POLLED Transfers data according to the interval defined in the Update Rate field. Only values that have changed since the last poll are transferred. If you specify polled, you must specify an update rate in the next field.

***Update Rate or TAG** Number of seconds between updates if the update type is polled. This can either be a constant or a tag name.

If you specify a digital tag, the tag acts as a poll trigger. A transition from 0 to 1 or a forced value of 1, initiates a poll.

If you specify an analog tag, the value of the tag specifies the number of seconds between polls at run time. This may be changed at run time.

If you leave this field blank, 0 is assumed and polling is disabled.

	Valid Entry: standard tag name or numeric constant
	Valid Data Type: digital, analog
Data Transfer	<p>Specifies read/write privileges between the client and server. This can be one of the following:</p> <p>READONLY The client application can only receive data from the server application.</p> <p>READWRITE The client application can receive data from the server application and write data back to the server if the value of the element changes in the client application.</p> <p>Caution should be used with the READWRITE option. If data is rapidly changing on both the client and the server sides, this can cause what is known as the ping-pong effect.</p>
Status Message TAG	<p>PowerNet can display a status message on the status of the connection for the client. The following status messages can be received:</p> <p>Create Client—PowerNet has created the client object and is waiting to connect.</p> <p>Deleting Client—PowerNet is deleting the client object. This means no tags are associated with this domain.</p> <p>Connecting—The client object is in the process of connecting.</p> <p>Abort Connection—The client has aborted the connection. This usually means the server is not available.</p> <p>Connect Timeout—The server did not connect in the time allowed.</p> <p>Connected—The server has connected. This is the normal state for PowerNet.</p> <p>Bind Reply Timeout—The client did not receive a message from the server after the connect in the time allowed.</p> <p>Receive Reply Timeout—The server has not sent any response in the time allowed. The server has most likely quit abnormally.</p> <p>Send Failed—A problem occurred sending the data.</p> <p>Receive Disconnect—The server sent a disconnect message to the client. The server sends this message if PowerNet is shut down on the server host machine.</p> <p>Received Error—An error occurred during a read.</p>

- **POWERNET**
- *External Domain Definition Panel*
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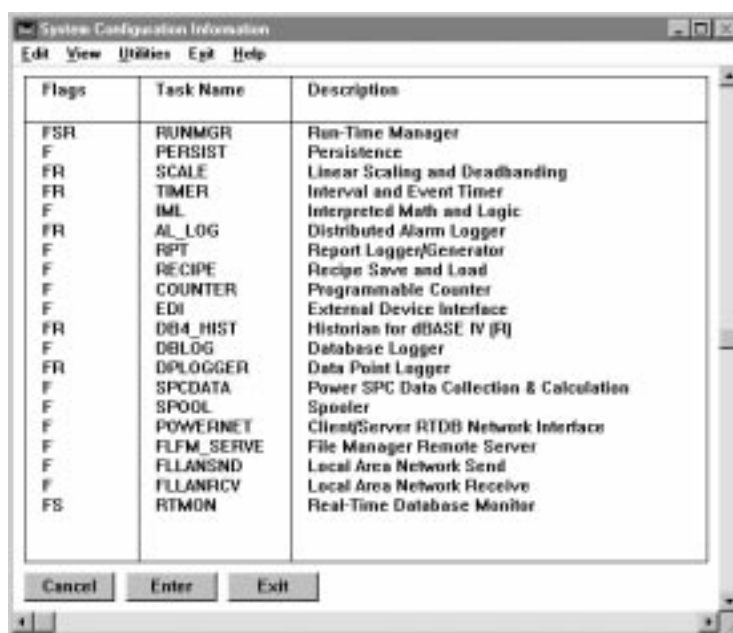
Force Writes Allows a client to send a forced write of a digital tag to the server to trigger an event.

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

SYSTEM CONFIGURATION INFORMATION PANEL

Perform the following steps to configure the System Configuration Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose System Configuration from the Configuration Manager Main Menu to display the System Configuration Information panel.



- 3 Specify the following information for this panel:

Flags R added to this field automatically starts PowerNet when FactoryLink is started.

Valid Entry: R

Program Argument Any desired program arguments that control how the task functions at run time. Following is a list specific to PowerNet:

-h<local host name>

- **POWERNET**
- *System Configuration Information Panel*
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-s<***service name***>

-b***n*** Where ***n*** is the buffer size
default : 512

-nn Where ***n*** is the number of sessions
default : 32 with maximum 1024

-e<***task name***>

-i<#> Where <#> is the number of milliseconds to
sleep after binding every 20 tags

Valid Entry: standard tag name

Valid Data Type: message

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

POWERNET MESSAGES

If any problems are encountered by PowerNet during run time, an error message is displayed on the Run-Time Manager screen next to the name of the PowerNet task in the SHARED domain screen.

This section lists all messages that can occur during the PowerNet run time, describes their possible causes, and provides corrective actions.

Cannot initialize NSI interface!

Cause: Network initialization failed.

Action: Check to ensure the TCP/IP network is installed and running. Also check that the POWERNET service name is added to the services file and the local and remote node names are known to the network either through the hosts file or the Domain Name Server.

Can't open CT file extrndom.ct

Cause: PowerNet cannot find the EXTRNDOM.CT file because the External Domain Definition table has not been configured.

Action: Use the Configuration Manager Main Menu to configure the External Domain Definition table.

Error creating service object! NSI error %4x

The network has a problem. Any of the following conditions could cause this error:

Cause: No more sockets are available.

Action: Shut down other network processes to free up sockets or increase the number of available sockets if possible.

Cause: The POWERNET service name cannot be found in the services file.

Action: Check the services files for the POWERNET service name or other service name being used.

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Cause: The remote node name cannot be found in the hosts file.

Action: Check for the correct remote node name and address in the hosts file or Domain Name Server. Ensure the node name is in both lower and upper case (one being the alias).

Cause: Another process is already bound to the same service name.

Action: Check if another copy of PowerNet is already running or another process could be using the same service name. If multiple copies of PowerNet are run on a single node, they must all use different service names.

Error exposing service object! NSI error %4x

There is a problem with the network. Any of the following conditions could cause this error:

Cause: No more sockets are available.

Action: Shut down other network processes to free up sockets or increase the number of available sockets if possible.

Cause: The POWERNET service name cannot be found in the services file.

Action: Check the services files for the POWERNET service name or other service name being used.

Cause: The remote node name cannot be found in the hosts file.

Action: Check for the correct remote node name and address in the hosts file or Domain Name Server. Ensure the node name is in both lower and upper case (one being the alias).

Cause: Another process is already bound to the same service name.

Action: Check if another copy of PowerNet is already running or another process could be using the same service name. If multiple copies of PowerNet are run on a single node, they must all use different service names.

Error reading CT header

- Cause:** The EXTRNDOM.CT file is corrupt.
- Action:** Rebuild the file by deleting the EXTRNDOM.CT file and restarting FactoryLink.

Error reading CT index

- Cause:** The EXTRNDOM.CT file is corrupt.
- Action:** Rebuild the file by deleting the EXTRNDOM.CT file and restarting FactoryLink.

Error reading CT record

- Cause:** The EXTRNDOM.CT file is corrupt.
- Action:** Rebuild the file by deleting the EXTRNDOM.CT file and restarting FactoryLink.

Mailbox tag *tagname* is ignored in the write-back domain

- Cause:** A domain configured as READWRITE contains at least one mailbox tag. The message is displayed to warn the user that mailbox tags are ignored in the write-back domain. All other tags will still work.
- Action:** None is needed, but if the user wants to get rid of the warning message, he/she can change any domains containing mailbox tags to READONLY. If the user wants that domain to be READWRITE, he/she can remove any mailbox tags from that domain and create a new READONLY domain for the mailbox tags.

No local host or FLHOST variable supplied

- Cause:** The FLHOST variable is not supplied.
- Action:** Either set the FLHOST variable before running Powernet or pass it to Powernet using the -s argument.

Out of RAM

- Cause:** The process could not allocate needed memory.
- Action:** Close any unnecessary windows or programs, such as the Application Editor. If this error message is displayed often,

- **POWERNET**
- *PowerNet Messages*
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depending on the operating system, more memory may need to be added to the system or the existing memory may need to be configured differently.

Unsupported data type for PowerNet.

Cause: A tag of an unsupported type is configured.

Action: Contact Technical Support.

Power SPC

PowerSPC is a statistical process control module used as a quality management tool that collects, displays, and analyzes real-time and historical data, archives data, monitors trends, triggers alarms, and trends process capabilities and performances.

This chapter provides a field-by-field description of the configuration panels used to configure the Power SPC task:

- **Sample Plans table**
 - **Sample Plan Definition panel**—Refer to “Sample Plan Definition Panel” on page 318 for more information.
 - **Collection Control panel**—Refer to “Collection Control Panel” on page 321 for more information.
 - **Calculation Control panel**—Refer to “Calculation Control Panel” on page 348 for more information.
 - **Monitor Control panel**—Refer to “Monitor Control Panel” on page 329 for more information.
- **Power SPC Processes table**
 - **Process Definition panel**—Refer to “Process Definition Panel” on page 332 for more information.
 - **Data Collection Control panel**—Refer to “Data Collection Control Panel” on page 339 for more information.
 - **Auxiliary Collection panel**—Refer to “Auxiliary Collection Panel” on page 343 for more information.
 - **Acceptance Sampling panel**—Refer to “Acceptance Sampling Panel” on page 345 for more information.
 - **Calculation Control panel**—Refer to “Calculation Control Panel” on page 348 for more information.
 - **Monitor Control panel**—Refer to “Process Monitor Control Panel” on page 359 for more information.
- **SPC Charts table**
 - **Chart Definition panel**—Refer to “Chart Definition Panel” on page 365 for more information.

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- Calculation Display panel—Refer to “Calculation Display Panel” on page 372 for more information.
- Auxiliary Data Display panel—Refer to “Auxiliary Data Display Panel” on page 379 for more information.
- Control Chart panel—Refer to “Control Chart Panel” on page 381 for more information.
- Bar Chart Display panel—Refer to “Bar Chart Display Panel” on page 384 for more information.
- Chart Information panel—Refer to “Chart Information Panel” on page 389 for more information.
- Ad Hoc Chart Calculation panel—Refer to “Ad Hoc Chart Calculation Panel” on page 391 for more information.
- Chart Style panel—Refer to “Chart Style Panel” on page 396 for more information.
- User-Defined Cause Code table
 - Cause Code Definition panel—Refer to “Cause Code Definition Panel” on page 399 for more information.
 - Run Rule Definition panel—Refer to “Run Rule Definition Panel” on page 401 for more information.
 - Auxiliary Schema Definition panel—Refer to “Auxiliary Schema Definition Panel” on page 406 for more information.
 - Auxiliary Schema Control panel—Refer to “Auxiliary Schema Control Panel” on page 408 for more information.

SAMPLE PLANS TABLE

The sample plan defines a set of values and instructions that controls what data the system collects, calculates, evaluates, and displays. It also defines the contents of each sample, including its dimensions and characteristics. You should organize the sample plan by the data items you want to collect, configure calculations for each data item, and then configure the run rules for each calculation.

You create a sample plan by configuring the Sample Plans table. There are four panels to this table:

- **Sample Plan Definition panel**—Defines controls for how the plan functions during data collection, calculation, and monitoring.
- **Collection Control panel**—Defines the variable and attribute data to be collected for the sample plan.
- **Calculation Control panel**—Defines calculations performed by SPC on each group of data defined in the Collection Control panel.
- **Monitor Control panel**—Defines the run rules for each calculation defined in the Calculations Control panel.

- **POWER SPC**
- *Sample Plan Definition Panel*
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SAMPLE PLAN DEFINITION PANEL

Perform the following steps to configure the Sample Plan Definition panel:

- 1 Ensure the domain selected is correct in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Sample Plans in the Configuration Manager Main Menu to display the Sample Plan Definition panel.

Sample Plan Name [Required]	Restrict Dynamic Changes?	Exclude Data With Assignable Cause?	Reject Undefined Dimn & Char Names?

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:

Sample Plan Name (Required) Alphanumeric name of 1 to 16 characters that specifies the name for this sample plan. Create a meaningful name that corresponds to the data the sample plan monitors. You can define more than one sample plan for the same process.

Valid Entry: alphanumeric string of 1 to 16 characters

Restrict Dynamic Changes? (Optional) Indicates whether, after FactoryLink loads the sample plan values into the tags in an SPC process or an SPC chart, the operator or another FactoryLink module can dynamically change (override) the values established by the sample plan. This can be one of the following:

YES Do not permit dynamic changes. SPC rejects all changes to the tags controlling the SPC process or chart and uses the values defined in the sample plan.

	NO	Permit dynamic changes. This is the default.
Exclude Data With Assignable Cause	(Optional)	Indicates whether the control limit calculations should include data that has an assignable cause. This can be one of the following: <ul style="list-style-type: none"> YES Exclude assignable cause data from control limit calculations. You must specify which cause codes to exclude in the Cause Code panel described in Chapter 9, “Customizing your Process,” in the <i>PowerSPC Configuration Guide</i>. O Include assignable cause data in control limit calculations. This is the default.
Reject Undefined Dimn & Char Names?	(Optional)	Indicates whether or not SPC should reject names of dimensions or characteristics not defined in the Collection Control panel. This can be one of the following: <ul style="list-style-type: none"> YES SPC rejects the data collected. Choose YES if you want to restrict the operator from changing dimensions and characteristics at run time. NO SPC accepts the data collected. Choose NO if you want the operator to be able to change the dimensions and characteristics at run time. This is the default.
Acceptance Sampling	(Optional)	Indicates whether or not this sample plan uses acceptance sampling on collected sample data. You can use acceptance sampling with characteristic and dimension data. If you are using dimension data, also fill out the Dimn LSL, Dimn USL, and Dimn Nominal fields in the Collection Control panel. Acceptance sampling is used to measure the quality of goods received from a supplier. This can be one of the following: <ul style="list-style-type: none"> NONE Do not use acceptance sampling for this sample plan. This is the default. FIXED Use acceptance sampling for a sample that contains a fixed number of subgroups. When SPC collects the number of samples you type in the Sample Size field (described below), SPC closes the sample and evaluates it. VARIABLE Acceptance sampling for a sample that varies in size. If you choose this option, also define a Close

- **POWER SPC**
- *Sample Plan Definition Panel*
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Sample Trigger in the Acceptance Sampling panel. The Close Sample Trigger triggers SPC to close the sample and evaluate it. For information, see Chapter 6, “Configuring the Processes,” in the *PowerSPC Configuration Guide*.

If this sample plan is using acceptance sampling, also configure the Acceptance Sampling panel from the Processes menu option. For information, see Chapter 6, “Configuring the Processes,” in the *PowerSPC Configuration Guide*.

Define the following three fields only for acceptance sampling. If you entered NONE in the Acceptance Sampling field, leave these fields blank.

- | | |
|-----------------|---|
| Accept Criteria | <p>(Optional) Unique number between 0 and 999999 that specifies the number of units from the sample group that must pass all defined measurements and/or inspections for the entire lot to pass.</p> <p>For inspections, SPC uses the number of defective units, not the number of defects, to determine the number of units that pass.</p> <p>Use this field only if you typed either FIXED or VARIABLE in the Acceptance Sampling field.</p> <p style="padding-left: 40px;">Valid Entry: unique number between 0 and 999999</p> |
| Sample Size | <p>(Optional) Unique number between 0 and 999999 that specifies the number of units to be evaluated.</p> <p>Use this field only if you typed either FIXED or VARIABLE in the Acceptance Sampling field.</p> <p style="padding-left: 40px;">Valid Entry: unique number between 0 and 999999</p> |
| Lot Size | <p>(Optional) Unique number between 0 and 999999 that specifies the total number of units in the lot (batch) the sample group is taken from.</p> <p>Use this field only if you typed either FIXED or VARIABLE in the Acceptance Sampling field.</p> <p style="padding-left: 40px;">Valid Entry: unique number between 0 and 999999</p> |

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

COLLECTION CONTROL PANEL

Perform the following steps to configure the Collection Control panel:

- 1 Ensure the domain selected is correct in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Sample Plans in the Configuration Manager Main Menu to display the Collection Control panel.

Dimn or Char Name [Required]	Dimn or Char Type [Required]	Subgroup Size	Dimn LSL	Dimn USL

Sample Plan Name

- 3 Specify the following information for this panel:

Dimn or Char Name	(Required) Alphanumeric string of 1 to 16 characters that specifies the name of either the dimension to collect (for example, length) or the characteristic to inspect (for example, dent or bubble). If you chose in the Sample Plan Definition panel to reject undefined names, enter all dimension and characteristic names in this field. Enter an asterisk (*) in this field instead of a name if you want SPC to perform the calculation(s) defined in the Calculation Control panel for this entry on the combined total of all types of characteristics in this panel, rather than on each separate characteristic. This is useful if you want to find the total number of defects on a unit. Valid Entry: alphanumeric string of 1 to 16 characters
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- **POWER SPC**
- *Collection Control Panel*
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Dimn or Char Type (Required) Indicates whether the name specified in the previous field, Dimn or Char Name, is a dimension or a characteristic. This can be one of the following:

Dimension Specifies you are collecting a measurement (for example, length or temperature). This is the default.

Characteristic Specifies you are collecting occurrences of a defect or defective part (for example, dents, bubbles, wrong color, or missing label). Specify this option if you typed * in the Dimn or Char Name field of this panel.

Subgroup Size (Optional) Unique number between 0 and 9999 that specifies the number of measurements or characteristics to be grouped together and collected before SPC automatically performs a calculation on the data. In other words, the number of samples in a subgroup.

The entry in this field determines the subgroup size for all dimensions and characteristics; however, you can override this subgroup size for a particular calculation with the Calc Size field in the Calculation Control panel described in “Defining the Sample Plans Calculations” in the *Power SPC User Manual*.

Valid Entry: unique number of 0 and 9999

Complete the next two fields to determine pass/fail criteria for dimensions only if this sample plan is

- Using acceptance sampling.
- SPC will perform calculations on populations of data. A population is all the points currently visible on a chart. The Sample Plan Collection Control LSL and USL are required for chart Info Cp and Cpk calculations.

The limits in these fields do not show as lines on the chart unless you also complete the LSL for Calculation, USL for Calculation, and Nominal for Calculation fields on the Calculation Control panel of this table.

Dimn LSL (Optional) floating-point, integer that specifies the lower specification limit (LSL) for a dimension. If this sample plan is using acceptance sampling on dimension data, type the minimum acceptable value for the dimension. Leave this field blank if you are inspecting a characteristic.

Valid Entry: floating-point, integer

Dimn USL (Optional) floating-point, integer that specifies the upper specification limit (USL) for a dimension. If this sample plan is using acceptance sampling on dimension data, type the maximum acceptable value for the dimension. Leave this field blank if you are inspecting a characteristic.

Valid Entry: floating-point, integer

Dimn Nominal floating-point, integer that specifies the target value for a dimension. Type the target value for the dimension if this sample plan is using acceptance sampling on dimension data.

Valid Entry: floating-point, integer

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **POWER SPC**
- *Sample Plan Calculation Control Panel*
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SAMPLE PLAN CALCULATION CONTROL PANEL

Perform the following steps to configure the Sample Plan Calculation Control panel:

- 1 Ensure the domain selected is correct in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Sample Plans in the Configuration Manager Main Menu to display the Sample Plan Calculation Control panel.

Calc Name [Required]	Pre-Control LCL	Pre-Control UCL	Pre-Control Center	LSL for Calculation	USL for Calculation

Dimn or Char Name

- 3 Specify the following information for this panel:

Calc Name

(Required) Calculation to perform on the dimension or characteristic you typed in the Dimn or Char field on the Collection Control panel. The following table lists valid entries for both dimension and characteristic data. Refer to the Glossary or the Overview for descriptions of these calculations.

Note: If you are configuring this panel for a bar chart, type any calculation name in this field. Although SPC does not perform calculations for bar charts, the system requires you type something in this field.

Type the initial control limits for the calculation in the next three fields. SPC uses these control limits at system startup to evaluate run rules and plot charts until the operator or another FactoryLink module triggers SPC to recalculate new control limits or changes the values while the process is disabled.

If you want SPC to recalculate the control limits from these fields, also define a tag to trigger SPC to recalculate them. Define this tag in the Control Limit Trigger Tag field in the Processes option Calculation Control panel. If you do not want SPC to recalculate these control limits, do not define the Control Limit Trigger Tag. Then, SPC always uses the control limits in these fields unless the operation or another task changes the control limits at run time while the process is disabled

Pre-Control LCL (Optional) floating-point, integer that specifies the initial lower control limit for the calculation. The entry in this field applies only to the calculation displayed in this row.

Valid Entry: floating-point, integer

Pre-Control UCL (Optional) floating-point, integer that specifies the initial upper control limit for the calculation. The entry in this field applies only to the calculation displayed in this row.

If this control limit value is for a Split calculation, type a value halfway between the width of the two center lines. Specify the width for the center lines in the Calc Constant field on the Calculation Control panel.

Valid Entry: floating-point, integer

Pre-Control Center (Optional) floating-point, integer that specifies the initial center value for the calculation. The entry in this field applies only to the calculation displayed in this row.

Valid Entry: floating-point, integer

You display specification limit lines for dimensions on the SPC chart in the next three fields. If you type limits in these fields, SPC uses them to perform the calculation in the Calc Name field and to recalculate control limits. Be careful when you use these fields because specification limits can affect calculation results.

If you want to perform a calculation on a population or if this sample plan is using acceptance sampling, define specification limits in the Collection Control panel. If you want to display them, also fill out the following three fields. Typically you enter the same values in both sets of fields; however, you can enter different values for greater control.

The LSL and USL in this panel is used for subgroup based Cp and Cpk calculation in the SPC Process and for Run Rule monitoring.

Leave these fields blank if you are configuring a calculation for a characteristic.

- **POWER SPC**

- *Sample Plan Calculation Control Panel*

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LSL for Calculation (Optional) floating-point, integer that specifies the lower specification limit for a dimension.

Valid Entry: floating-point, integer

USL for Calculation (Optional) floating-point, integer that specifies the upper specification limit for a dimension.

Valid Entry: floating-point, integer

Nominal for Calculation (Optional) floating-point, integer that specifies the target value for a dimension.

Valid Entry: floating-point, integer

Calc Size (Optional) If you want to override the subgroup size you defined in the Collection Control panel, type the amount of data SPC is to use for the calculation. The entry in this field only applies to the calculation you type in the Calc Name field described above.

Leave this field blank if you want SPC to perform a calculation according to the subgroup size you defined in the Collection Control panel. At run time, SPC performs all calculations that do not have an entry in this field at the same time and on the same data.

If you enter a value in this field, SPC does not perform this calculation the same time as the rest of the calculations that are based on the subgroup size defined in the Collection Control panel. This can be one of the following:

1 INDIV

2 - 9999 CP, CPK, MOVRNG, MOVAVG, EWMA (SPC performs a calculation for these each time it collects a new value; however, it performs the calculation on the new value + the number of values you type in this field.)

1 - 9999 Other calculations

For EWMA calculations, the value you type in this field depends on the value you type in the Calc Constant field. Generally, a value between 0.1 and 0.3 is used for λ . At a value of 0.3 for λ , a calc size of around 25 is recommended; 0.2 for λ , a calc size of 50; and 0.1 for λ , a calc size of 75.

Calc Offset (Optional) floating-point, integer that specifies a constant value to normalize each calculation result (on a per-calculation basis). SPC subtracts the offset from the calculated value. If you also

specify a scale value in the Calc Scale field, SPC subtracts the offset from the calculated value and divides the result by the scale value. This field is useful with mean-type calculations, such as XBARR and INDIV. We recommend you not use it for STDDEV and RANGE calculations.

Valid Data Type: floating-point, integer

Calc Scale (Optional) floating-point, integer that specifies a constant value to normalize each calculation result. SPC divides the calculated value by the scale value and displays the converted value. The data is archived as its original values. This field is useful with mean-type calculations, such as XBARR and INDIV. We recommend you not use it for STDDEV and RANGE calculations.

Valid Entry: floating-point, integer

Calc Constant (Optional. Use this field only for EWMA, Cp, Cpk, or Split calculations.) Type the constant value SPC uses for the calculation. Type 0 unless you are configuring an EWMA, Split, Cp, or CPK calculation.

If you are using Cp or Cpk, the number in this field fits into the Cp and Cpk calculations as shown on page 278. We recommend you use 3.

If you are using Split, type the width of the center line in this field. The width is the range of values between the two center lines. For example, if you want the center line (mean) at 25 and 15, type 10 in this field. Also, type a value midway between the width of the center line in the Pre-Control Center field of the Calculation Control panel. We recommend you not define a tag in the Control Limit Trigger Tag field in the Processes option's Calculation Control panel

.Any number > 0 (default = 3) CP, CPK

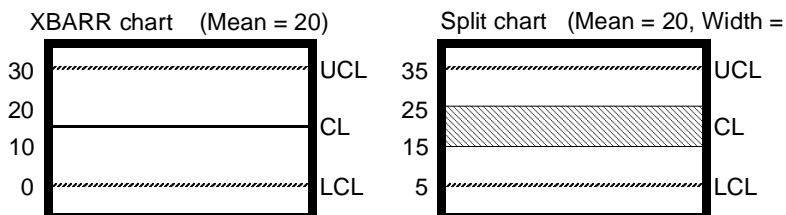
Any λ value. Enter only the EWMA decimal and the number, such as .2.
(We suggest .2 + .1.)

Also, see "Calc Size" on page 278.

Any value ≥ 0 (default = 0) Split

0 (default) Other calculation

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- *Sample Plan Calculation Control Panel*
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Caution: We recommend you use this field only if you are knowledgeable and experienced with adjusting these calculations.

Points in Control Limit Calc (Optional) Unique number between 1 and 9999 that specifies the number of points (calculated values) SPC uses to calculate the control limits.

Valid Entry: unique number between 1 and 9999

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

MONITOR CONTROL PANEL

Perform the following steps to configure the Monitor Control panel:

- 1 Ensure the domain selected is correct in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Sample Plans in the Configuration Manager Main Menu to display the Monitor Control panel.

Run Rule Name [Required]	Run Rule Priority	Run Rule Filter	

Calc Name

- 3 Specify the following information for this panel:

Run Rule Name (Required) Run rule name. You can type either a standard Western Electric run rule name or any run rule you define in the User-Defined Run Rule Definition panel. Refer to the Glossary entry "Western Electric run rule" for information. We recommend you not use more than 10 run rules per calculation.

Valid Entry: alphanumeric string of up to 16 characters

2OF3
 4OF5
 3SIGMA
 8CONS
 TREND

Run Rule Priority (Optional) If you configure several run rules for the same calculation, you can type a value in this field to specify the order SPC reports run rule violations in. If you leave this field blank,

- **POWER SPC**
- *Monitor Control Panel*
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SPC uses any default priorities specified in the user-defined run rules. If no default priorities, evaluates the run rules in the order you enter them in this panel.

If you assign priorities and configure only one output-text tag to display the violated run rule, SPC displays the highest priority run rule violated. This can be one of the following:

0 Rules with equal priority

1 - 32767 1 is the highest priority; 32767 is the lowest.

Run Rule Filter	(Optional) Indicates how you want SPC to report and record run rule violations. Use this field to filter out violations if you do not want data above and/or below the center value to signify a violation. This can be one of the following:
EITHER	(Default) SPC detects/reports both upper and lower zone violations. If all the points violating the run rule, that is, those points either above or below the center line, SPC reports run rule violations. Points on opposite sides of the center line do not count toward the same violation instance.
UPPER	SPC detects/reports only upper zone violations. If all the points violating the run rule lie above the center line, SPC reports a run rule violation. Points on the lower side of the center line do not count toward a violation.
LOWER	SPC detects/reports only lower zone violations. If all the points violating the run rule lie below the center line, SPC reports a run rule violation. Points on upper side of the center line do not count toward a violation.
BOTH	SPC detects/reports zone violations both above and below the center line. SPC reports run rule violations regardless of the point's relation to the center.

4 Click on Enter to save the information.

5 Click on Exit to return to the Main Menu.

POWER SPC PROCESSES TABLE

You must configure a Power SPC process for each manufacturing process you want SPC to monitor. When you configure a process, you are instructing Power SPC how to use the sample plan to monitor that process, such as what data to collect, what calculations to perform, and what run rules to evaluate the data against.

In the Power SPC process, you can set up tags to let the operator change many aspects of the process at run time, such as, which sample plan the process uses, which run rules SPC evaluates, which calculations SPC performs, whether SPC performs acceptance sampling.

You configure a Power SPC process by configuring the Power SPC Processes table. There are six panels to this table:

- Process Definition panel—Defines the processes SPC monitors.
- Data Collection Control panel—Defines the raw data to be collected.
- Auxiliary Collection panel—Defines the auxiliary data to be collected.
- Acceptance Sampling panel—Defines acceptance sampling criteria.
- Calculation Control panel—Defines the calculations to run on this process.
- Monitor Control panel—Defines the run rules that control this process.

- **POWER SPC**
- *Process Definition Panel*
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PROCESS DEFINITION PANEL

Perform the following steps to configure the Process Definition panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Processes in the Configuration Manager Main Menu to display the Process Definition panel.

Process Name [Required]	*Sample Plan Name [Required]	*Location Name [Required]	*Subgroup Name [Required]

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:

Process Name

(Required) Alphanumeric string of 1 to 16 characters that specifies the process to be monitored (for example, COLA).

Valid Entry: alphanumeric string of 1 to 16 characters

Sample Plan Name

(Required) Sample plan the process uses. (You defined all sample plans in the Sample Plan option's Sample Plan Definition panel.) This can be one of the following:

Constant

Alphanumeric string of 1 to 16 characters preceded by a single quote that specifies a sample plan name.

Variable Name of a tag that indicates the Sample Plan. The data type for this tag is message. If you type a tag name, the operator can change the sample plan used by the process at run time.

Before changing the sample plan in use, the operator must stop the SPC process (but not the SPC module or the application). When the operator restarts the process, SPC loads the new sample plan values into the tags defined in this panel. For information about stopping the process, see the Process Disable Toggle field on page 335.

Location Name (Required) The process location. This enables FactoryLink to distinguish between multiple instances of the same process. Charts retrieve data by process name, location, and/or subgroup. Write this name down because later you will type the same location in the Chart Definition panel. (See Chapter 8, “Configuring SPC Charts,” in the *PowerSPC Configuration Guide*.) This can be one of the following:

Constant Alphanumeric string of 1 to 16 characters preceded by a single quote that specifies a location, such as a node name, a city, or a floor in the building; for example, ‘Pittsburgh.

Variable Name of a tag that indicates the location. If you use a tag for this field, we recommend you define a default value for it that matches a valid location name.

If you leave this field blank, the system enters LOCAL.

For a constant value, ensure there is an alphanumeric string of up to 42 characters exist (precede the string with a single quote).

Valid Data Type: message

Before changing the location in use, the operator must stop the SPC process (but not the SPC module or the application). When the operator restarts the process, SPC loads the new location defined in this panel. Refer to the Process Disable Toggle field on page 335 for information about stopping the process.

Subgroup Name (Required) Indicates the name of the subgroup from which SPC collects the raw data. This can be one of the following:

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- *Process Definition Panel*
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Constant Alphanumeric string of 1 to 42 characters preceded by a single quote that specifies a subgroup name (for example, 'GLASS BOTTLES).

Variable Name of a tag that identifies the product and process conditions for the data being collected. Define message as the data type for this tag. If you use a tag for this field, define a default value for it that matches a valid subgroup name.

Write this name down because later you will type the same subgroup name in the Chart Definition panel. See Chapter 8, “Configuring SPC Charts,” in the *PowerSPC Configuration Guide* for more information. If more than one process is active at the same time, the concatenation of location name plus subgroup name must be unique for each process.

Before changing the subgroup, the operator must stop the SPC process (but not the SPC module or the application). When the operator restarts the process, SPC loads the new subgroup defined in this panel. For information about stopping the process, see the Process Disable Toggle field on page 335.

Historian Database Alias Name (Required) Alphanumeric string of 1 to 16 characters that specifies the alias name of the database you defined in the Database Alias Name field in the Historian Information panel.

Valid Entry: alphanumeric string of 1 to 16 characters

Historian Mailbox (Required) Name of the mailbox tag you defined in the Historian Mailbox field in the Historian Mailbox Information panel. SPC routes data through this tag to the database. We recommend you use the same mailbox for all the processes. If your application requires more than 300 processes, you may need to use a second mailbox tag. Define mailbox as the data type for this tag.

The combination of subgroup and location names should be unique among processes. If they are not, the Historian will not function properly. Power SPC will not allow a process to start if it has the subgroup and location name combination identical to an already running process. If subgroup name and location names are dynamically changed in running processes and a combination is not unique among running processes, then possible database damage may result.

Contact Customer Support for a document containing a detailed description of the Power SPC database relations.

	Valid Entry: standard tag name Valid Data Type: mailbox
Process Disable Toggle Tag	<p>(Required) Name of a tag that stops and restarts the SPC process at run time. You can tie this tag to a button on a graphics screen so the operator can toggle the process on and off at run time.</p> <p>To stop the process at run time, set this tag to 1 or any non-zero value. Set the tag back to 0 to restart the process.</p> <p>This tag is useful if the operator wants to change something in the process, such as the sample plan used, the run rules evaluated or the subgroup size. To change these things, the operator must first stop the process, make the change, and then restart it.</p> <p>However, the operator can change some things, such as the Dimn or Char Name or Type without stopping the process. The Process disable/enable cycle requires significant processor overhead.</p> <p>Valid Entry: standard tag name Valid Data Type: digital, analog, longana, float (default = digital)</p>
Accept Data Trigger Tag	<p>(Required) Name of a tag that triggers SPC to accept and store the collected data in the database. When this tag is 1(ON) or greater, SPC accepts and stores the collected data.</p> <p>When SPC is ready to accept more data, it sets this tag back to 0 (OFF). This tag can be used to discard invalid collected data if the Collect Data Trigger field is configured by setting the Accept Data Quantity to 0 and then triggering the Accept Data Trigger tag.</p> <p>You can use this field in conjunction with the Collect Data Trigger Tag field to collect multiple values and store them together in one location in the database. For more information, see the Collect Data Trigger Tag field on page 337.</p> <p>At run time, the operator or another FactoryLink module can trigger this tag without stopping the process.</p> <p>Valid Entry: standard tag name (default = digital) Valid Data Type: digital, analog, longana, float</p>
Accept Data Quantity	<p>(Required) This field has a constant value of 1-9999. For Dimension data, enter a value or a tag that will be set to the number of valves that will be accepted before collecting Dimension data. When collecting one raw data value at a time and then accepting it, use an Accept Data Quantity value greater than 1, be aware that INDIVIDUAL calculated values will</p>

- **POWER SPC**
- *Process Definition Panel*
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actually be the average of the values accepted. For more information on collecting data, see the Collect Data Trigger Tag on page 337.

For characteristic data, you can enter a value greater than 1 and SPC will record the defect or defective quantities as representing more than 1 unit inspected.

If you enter a tag in this field and the operator or another module sets it to 0 and triggers the Accept Data Trigger tag, SPC deletes all data collected since the last time the data was accepted. This can be useful when the collected data is invalid.

At run time, the operator or another FactoryLink module can change this tag without stopping the process.

Valid Entry: standard tag name or constant (numeric value between 1 and 9999) (default = analog)

Valid Data Type: digital, analog, longana, float

Accept Data
Completion Tag

(Optional) Name of a tag that indicates the system has accepted and finished storing the data in the database. When the system successfully writes the data to the database, it force writes ACCEPT or a 1 for non-message tag types to this tag.

At run time, the operator or another FactoryLink module can change this tag without stopping the process. If you define this tag as digital, SPC force writes a 1 to it whenever it completes an attempt to send data to the database, whether the data is successfully stored or not.

When This Tag Value Is...	Then SPC...
0 or NODATA	Is waiting for data to send to the database.
1 or ACCEPT	Has successfully sent the data out to the database.
-1 or ERROR	Was not able to send the data to the database.

Valid Entry: standard tag name (default = message)

Valid Data Type: digital, analog, longana, float, message

Collect Data Trigger Tag (Optional) Name of a tag that triggers the system to collect the data from the tags you specify in the Data Collection Control panel and hold their values in memory until SPC collects all data for the unit. You can collect as many values before accepting them into the database as available memory can handle.

Use this tag in conjunction with the Accept Data Trigger Tag, described above, to instruct SPC to store all the data it collects as one "transaction." If you leave this field blank, the Accept Data Trigger Tag triggers SPC to collect the data and store it in the database, but each piece of data is stored separately.

You can also use this field in conjunction with the Accept Data Quantity Tag to hold values in memory while verifying if they are valid before storing them in the database.

The Collect Data Trigger Tag will be reset to 0 by Power SPC when the collection has been completed.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float

Process Status Tag (Optional) Name of a tag that indicates whether the process is active or inactive.

When This Tag's Value Is...	Then...
-2	SPC is loading the process configuration.
-1	SPC has successfully loaded the configuration and has started loading the sample plan.
0	SPC has successfully loaded the sample plan; the process is still inactive.
1	The process is active.

Even if you define this tag as message data type, the tag value will be numeric.

Valid Entry: standard tag name (default = analog)

Valid Data Type: analog, longana, float, message

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Process Message Tag (Optional) Name of a tag that displays a status or error message about the process. You can tie this tag to an output-text object on a graphics screen to display status and error messages to the operator at run time.

Valid Entry: standard tag name

Valid Data Type: message

Dynamic Change Tag (Optional) If you want to override the Restrict Dynamic Changes value you typed in the Sample Plan Definition panel, type the name of a tag that indicates whether, after FactoryLink loads the sample plan values into the tags in this process or an SPC chart, the operator or another FactoryLink module can dynamically change (override) the values established by the sample plan.

When this tag is greater than 0, SPC rejects all changes to the tags controlling the process or chart and uses the values defined in the sample plan. When this tag is 0, SPC allows the operator or another module to change the tags controlling this process. When the initial Sample Plan is loaded or a new Sample Plan is loaded, the value for this tag is cleared.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float

Exclude Data With Assignable Cause Tag (Optional) If you want to override the Exclude Data with Assignable Cause? value you defined in the Sample Plan Definition panel, type the name of a tag that lets the operator determine whether the control limit calculations should include data that has an assignable cause. See Chapter 9, "Customizing your Process," in the *PowerSPC Configuration Guide* for more information.

At run time, the operator or another FactoryLink module can change this tag without stopping the process. When the initial Sample Plan is loaded or a new Sample Plan is loaded, the value for this tag is cleared.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float, message

4 Click on Enter to save the information.

5 Click on Exit to return to the Main Menu.

DATA COLLECTION CONTROL PANEL

Perform the following steps to configure the Data Collection Control panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Processes in the Configuration Manager Main Menu to display the Data Collection Control panel.

*Dimn or Char Name [Required]	*Dimn or Char Type [Required]	Auxiliary Table Name [Required For Next Panel]	Dimn Measurement Tag

Process Name

- 3 Specify the following information for this panel:

The first two fields identify what raw data SPC collects and whether that data is dimensional or characteristic.

Dimn or Char Name (Required) Dimension or characteristic to display on the chart.
This can be one of the following:

- Constant
- Alphanumeric string of between 1 to 16 characters preceded by a single quote that specifies the name of the dimension or characteristic to display (for example, 'dent). If you do not precede the name with a single quote, SPC uses it as a tag name.
- Variable
- Name of a tag that identifies the dimension or characteristic to display on the chart.
- If you type a tag name in this field and specify a default value, SPC loads the default dimension or

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characteristic at startup. If you do not specify a default value, SPC loads one of the dimensions or characteristics configured in the sample plan.

- * Indicates you want SPC to perform the specified calculation on all characteristics. Only for calculations on characteristics, such as np, p, c, and u.

Be sure to indicate the type of calculation in the Calc Name field.

Valid Data Type: message

Dimn or Char Type (Required) Defines whether the name entered in the Dimn or Char Name field is a dimension or a characteristic. This can be one of the following:

Constant Name preceded by a single quote that specifies type. This can be either 'DIMENSION or 'CHARACTERISTIC.

Use 'DIMENSION if you are collecting a measurement (for example, length or temperature).

Use 'CHARACTERISTIC if you are collecting occurrences of a defect or defective part (for example, dents or bubbles).

Variable Name of a tag that indicates whether it is a dimension or a characteristic.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float, message

The next four fields identify where SPC stores the data it collects.

Auxiliary Table Name (Required for next panel) Alphanumeric string of up to 16 characters if you want to collect auxiliary data that corresponds to the raw data value specified in this panel. This name is displayed at the bottom of the next panel, Auxiliary Collection, and identifies the group of tags that contain the collected auxiliary values. This field lets you associate multiple auxiliary data tags with each raw data tag. Define the auxiliary data tags in the next panel, Auxiliary Collection.

Leave this field blank if you are not collecting auxiliary data. Also, leave the Auxiliary Collection panel blank.

Valid Entry: alphanumeric string of 1 to 16 characters

Dimn Measurement Tag (Optional) If you are measuring a dimension (you typed 'DIMENSION in the Dimn or Char Type field), type a tag in this field to contain the resulting measurement of that dimension.

The operator uses this to type in the raw data value or a PLC or other external device uses it to gather the data and send it to FactoryLink.

To instruct SPC to collect this value, also define an Accept Data Trigger Tag in the Process Definition panel.

Leave this field blank if you are inspecting for a characteristic (you typed 'CHARACTERISTIC in the Dimn or Char Type field).

Valid Entry: standard tag name (default = float)

Valid Data Type: digital, analog, longana, float

Char Defective Count Tag (Optional) If you are counting defectives (you typed CHARACTERISTIC in the Dimn or Char Type field), type a tag in this field to contain the resulting count value for the data.

The operator uses this tag to type in the raw data value, or by a PLC or other external device that gathers the data and sends it to FactoryLink.

If you define this tag as digital, it does not count the number of defective units, but rather it indicates whether a particular unit is defective (1 for defective, 0 for OK).

If you are using acceptance sampling, you may want to define this tag as digital so you can inspect a unit and, if it is defective, force-write a 1 (YES) to this tag. If it is not defective, force-write a 0 (NO). The Acceptance Sampling panel, described on page 345, lets you define another tag for keeping a count of the defective units.

To instruct SPC to collect this value, also define an Accept Data Trigger Tag in the Process Definition panel.

If the value defined in the Accept Data Quantity field is greater than 1, SPC stores the data as gathered from more than 1 unit.

Leave this field blank if you are measuring a dimension (you typed 'DIMENSION in the Dimn or Char Type field)

Valid Entry: standard tag name

Valid Data Type: digital, analog, longana, float (default = analog)

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Char Defect Count Tag (Optional) If you are counting defects, (you typed 'CHARACTERISTIC in the Dimn or Char Type field), type a tag in this field to contain the number of instances of that characteristic (defect).

The operator uses this tag to type in the raw data value or a PLC or other external device uses it to gather the data and send it to FactoryLink.

If you define this tag as digital, it does not count the number of defects, but rather it indicates whether a particular unit contains defects (1 for defects, 0 for no defects).

If the value defined in the Accept Data Quantity field is greater than 1, SPC stores the data as gathered from more than 1 unit.

To instruct SPC to collect this value, also define an Accept Data Trigger Tag in the Process Definition panel.

Leave this field blank if you are measuring a dimension (you typed 'DIMENSION in the Dimn or Char Type field).

Although the three previous fields are marked as optional fields, for each entry in the Data Collection Control panel the one appropriate field must be defined. The other two fields will be invalid choices for that entry unless you want a value counted as both a defect and defective.

Valid Entry: standard tag name (default = analog)

Valid Data Type: digital, analog, longana, float

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

AUXILIARY COLLECTION PANEL

Perform the following steps to configure the Auxiliary Collection panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Processes in the Configuration Manager Main Menu to display the Auxiliary Collection panel.

*Auxiliary Field Alias Name [Required]	*Auxiliary Data [Required]

Auxiliary Table Name [From Previous Panel]

- 3 Specify the following information for this panel:

Auxiliary Field Alias Name	(Required) Alphanumeric name of 1 to 16 characters that specifies the alias name of the database column that stores the auxiliary data being collected. You specify the data to be collected in the next field, Auxiliary Data. Type either the same name you defined in the Auxiliary Field Alias Name field in the Auxiliary Schema Definition panel or a tag that indicates the name in the Auxiliary Field Alias Name field. Define a name or a tag in this field and one in the next for each item of auxiliary information you want to collect. Valid Entry: alphanumeric name of 1 to 16 characters Valid Data Type: message
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Auxiliary Data (Required) Alphanumeric constant of between 1 to 48 characters preceded by a single quote which holds collected auxiliary data values to be stored in the database column indicated in the Auxiliary Field Alias Name field.

Valid Data Type: alphanumeric constant of 1 to 48 characters
(default = message)

Valid Data Type: digital, analog, longana, float, message

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

ACCEPTANCE SAMPLING PANEL

Perform the following steps to configure the Acceptance Sampling panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Processes in the Configuration Manager Main Menu to display the Acceptance Sampling panel.

Note: To use acceptance sampling, also define an Accept Data Trigger Tag in the Process Definition panel and one of the following in the Data Collection panel: Dimn Measurement Tag, Char Defective Count Tag, or Char Defect Count Tag.

Current Sample Size Output Tag	Current Failure Count Output Tag	Close Sample Trigger Tag	Sample Pass/Fail Status Tag	Acceptance Sampling

Process Name

- 3 Specify the following information for this panel:

Current Sample Size Output Tag (Optional) Name of a tag that indicates the number of units measured or inspected so far. SPC increments the value of this tag as it accepts each new value into the SPC database. When SPC closes a sample, it resets this tag to 0.

Valid Entry: standard tag name (default = analog)

Valid Data Type: analog, longana, float, message

Current Failure Count Output Tag (Optional) Name of a tag that indicates the number of units from the lot that failed the acceptance sampling.

Valid Entry: standard tag name (default = analog)

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Valid Data Type: analog, longana, float, message

Close Sample (Optional) Name of a tag that forces SPC to close the sample.
 Trigger Tag Type a tag in this field if you are performing acceptance sampling on a sample of varying size. Leave this field blank if you are performing it on a sample of a fixed size.

At run time, the operator or another FactoryLink module can trigger this tag without stopping the process.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float

Sample Pass/Fail (Optional) Name of a tag that indicates whether the latest closed
 Status Tag sample has successfully passed the acceptance sampling criteria.

At run time, the operator or another FactoryLink module can change this tag without stopping the process.

Valid Entry: standard tag name (default = message)

Valid Data Type: digital, analog, longana, float, message

Acceptance (Optional) Name of a tag that controls whether SPC performs
 Sampling acceptance sampling for this process. You can use acceptance sampling with characteristic and dimension data.

Before changing this tag, the operator must stop the SPC process but not the SPC module or the application. When the operator restarts the process, SPC loads the new sampling method. See the Process Disable Toggle Tag field on page 335 for information about stopping the process.

When This Tag Is...	Then...
0 or NONE	(Default) For this sample, use process sampling instead of acceptance sampling.
1 or FIXED	Acceptance sampling for a sample that contains a fixed number of subgroups. When SPC collects the number of samples you specify either in the Sample Plan panels or in the Sample Size field, SPC closes the sample and evaluates it.

When This Tag Is...	Then...
2 or VARIABLE	Acceptance sampling for a sample that varies in size.

Valid Entry: standard tag name (default = message)

Valid Data Type: analog, message

Accept Criteria (Optional) Name of a tag that indicates the number of units that must pass all defined measurements and/or inspections for the entire lot to pass. See “Data Collection Control Panel” on page 339 for the Sample Plans and Processes options.

Before changing this tag, the operator must stop the SPC process but not the SPC module or the application. When the operator restarts the process, SPC loads the new accept criteria. See page 335 for information about stopping the process.

Valid Entry: standard tag name (default = analog)

Valid Data Type: digital, analog, longana, float

Sample Size (Optional) Name of a tag that defines the number of units to be evaluated.

Before changing this tag, the operator must stop the SPC process (but not the SPC module or the application). When the operator restarts the process, SPC loads the new sample size. See page 335 for information about stopping the process.

Valid Entry: standard tag name (default = analog)

Valid Data Type: digital, analog, longana, float

Lot Size (Optional) Name of a tag that defines the total number of units in the lot (batch) SPC takes the sample group from.

Before changing this tag, the operator must stop the SPC process (but not the SPC module or the application). When the operator restarts the process, SPC loads the new lot size. See for information about stopping the process.

Valid Entry: standard tag name (default = analog)

Valid Data Type: digital, analog, longana, float

4 Click on Enter to save the information.

5 Click on Exit to return to the Main Menu.

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CALCULATION CONTROL PANEL

Perform the following steps to configure the Calculation Control panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Processes in the Configuration Manager Main Menu to display the Calculation Control panel.

Calc Control Tag Set Name [Required]	*Calc Name [Required]	*Dimn or Char Name [Required]	Calc Selection Scroll Tag	Current Calc Size Output Tag

Process Name

- 3 Specify the following information for this panel:

Calc Control Tag Set Name

(Required) Alphanumeric string of 1 to 16 characters that specifies the set of calculation control tags you define in this panel. Use these for reference in the Monitor Control panel described on page 359.

Valid Entry: alphanumeric string of 1 to 16 characters

Calc Name

(Required) Indicates the calculation to be performed. Type either the name of the calculation or the name of a tag that indicates the calculation. This can be one of the following:

Constant Name of the calc name to display preceded by a single quote. This can be one of the following:

'XBARR	t'MOVAVG	'NP
'XBARS	'MOVRNG	'P
'RANGE	'EWMA	'C
'STDDEV	'INDIV	'U
'SPLIT	'CP	
'AVG	'CPK	

Variable Name of a tag that indicates the data type. The data types can be analog or message depending on the kind of data stored in the tag.

If you define a tag in this field, at run time, the operator or another FactoryLink module can change between dimensions and characteristics defined in the sample plan without suspending the process. At run time, the operator or another FactoryLink module can edit the calculation being performed by writing to this tag if the following conditions exist:

The sample plan must have restrict changes defined as NO.

The operator or the module must first suspend the process. This means the value of the Process Status Tag defined in the Process Definition Control panel is 0.

If you define this tag as analog, the operator selects the number for the desired calculation. If you define it as message, the operator selects the name of the desired calculation. These numbers correspond to the calculations as shown.

Calculation	Analog Value	Calculation	Analog Value
XBARR	1	EWMA	9
XBARS	2	INDIV	10

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Calculation	Analog Value	Calculation	Analog Value
AVG	3	C	11
STDDEV	4	U	12
RANGE	5	NP	13
SPLIT	6	P	14
MOVAVG	7	CP	15
MOVRNG	8	CPK	16

See the Glossary or Chapter 1, “Overview,” in the *PowerSPC Configuration Guide* for descriptions of these calculations.

Dimn or Char
Name

(Required) Name of the dimension or the characteristic SPC is to perform the calculation on. You can type either a constant name or the name of a tag that indicates the dimension or characteristic.

- Constant

Alphanumeric string of 1 to 16 characters preceded by a single quote that specifies the name of the dimension or characteristic to display (for example, 'dent or 'length). If you do not precede the name with a single quote, SPC uses it as a tag name.
- Variable

Name of a tag that indicates the data type. If you define a tag in this field, at run time, the operator or another FactoryLink module can change between dimensions and characteristics defined in the sample plan without suspending the process.
- *

Indicates that you want SPC to perform the specified calculation on all characteristics. Only for calculations on characteristics, such as np, p, c, and u.

Since SPC cannot perform a calculation on all dimensions, if you type DIMENSION in the Dimn or Char Type field, do not type * in this field.

Be sure to indicate the type of calculation in the Char Name field. The operator must change the values in both this field and the Calc Name field to dynamically change the values that control a calculation. The same conditions must be met as when editing the calculation type to edit the values at run time.

Valid Data Type: message

Calc Selection Scroll Tag (Optional) Name of a tag that lets the operator scroll through and select from a list of calculations configured in the sample plan. SPC displays the available calculation names in the Calc Name tag. (Remember to animate the Calc Name tag as an input-text object in the Application Editor.) To scroll through the configured calculations, the operator increments or decrements the value of the Calc Selection Scroll Tag.

At run time, the operator or another FactoryLink module can scroll through and select from the values in this tag without stopping the process.

Valid Entry: standard tag name (default = analog)

Valid Data Type: analog, longana, float

Current Calc Size Output Tag (Optional) Name of a tag that indicates the number of measurements or inspections SPC has collected so far. The value of this tag increments by the number of measurements or inspections accepted. SPC resets this tag to 0 (OFF) after performing a calculation.

Valid Entry: standard tag name (default = analog)

Valid Data Type: analog, longana, float

Calc Trigger Tag (Optional) Name of a tag that triggers SPC to perform the calculation you specified in the Calc Name and Dimn or Char Name fields. The operator can trigger this tag to perform calculations early before SPC has collected an entire sample or subgroup of data.

At run time, the operator or another FactoryLink module can trigger this tag without disabling the process.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float

Calc Output Tag (Optional) Name of a tag that contains the result from the last time SPC performed the selected calculation. The output value represents the calculation performed on the latest subgroup of data.

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Valid Entry: standard tag name (default = float)

Valid Data Type: analog, longana, float, message

Control Limit Trigger Tag (Optional) Name of a tag that triggers SPC to recalculate the control limits for the calculation. When SPC is to recalculate the control limits, FactoryLink sets this value to 1 (ON).

At run time, the operator or another FactoryLink module can trigger this tag without disabling the process.

If you want to recalculate control limits, we recommend you set the Calc Size to no larger than 25. If you need the Calc Size to be larger than 25, you must specify a factor in the Factors Table. SPC will use to recalculate the control limits.

We recommend you not set up the application to trigger this tag too often because performance slows down while SPC recalculates the control limits.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float

Control Limit Calc Completion Tag (Optional) Name of a tag that indicates when SPC is done recalculating the control limits. Because the system slows down while SPC recalculates the control limits, use this tag to alert the operator or another module or to trigger an action when SPC has finished the recalculation.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float

LCL Value (Optional) If you want to override the LCL value you defined in the Sample Plan Calculation Control panel, type the name of a tag that identifies the lower control limit the last time SPC performed the selected calculation. To display this limit on the screen and let the operator view and edit this limit at run time, animate this tag as an input-text object in the Application Editor.

When the initial sample plan is loaded or a new sample plan is loaded, the value for this tag is cleared.

Before changing the value of this tag at run time, the operator or another module must first suspend the process.

If this value is edited, the new LCL value will apply to future calculations.

Valid Entry: standard tag name (default = float)

Valid Data Type: analog, longana, float, message

UCL Value	<p>(Optional) If you want to override the UCL value you defined in the Sample Plan Calculation Control panel, type the name of a tag that identifies what the upper control limit was the last time SPC performed the selected calculation. To display this limit on the screen and let the operator view and edit this limit at run time, animate this tag as an input-text object in the Application Editor.</p> <p>When the initial sample plan is loaded or a new sample plan is loaded, the value for this tag is cleared.</p> <p>Before changing the value of this tag at run time, the operator or another module must first suspend the process. The edited value applies to future calculations.</p> <p>Valid Entry: standard tag name (default = float) Valid Data Type: analog, longana, float, message</p>
Center Value	<p>(Optional) If you want to override the Center Value you defined in the Sample Plan Calculation Control panel, type the name of a tag that identifies what the center value was the last time SPC performed the selected calculation. To display this limit on the screen and let the operator edit this limit at run time, animate this tag as an input-text object in the Application Editor.</p> <p>When the initial sample plan is loaded or a new sample plan is loaded, the value for this tag is cleared.</p> <p>Before changing the value of this tag at run time, the operator or another module must first suspend the process. The edited value applies to future calculations.</p> <p>Valid Entry: standard tag name (default = float) Valid Data Type: analog, longana, float, message</p>
Highest Priority Run Rule Violation Output Tag	<p>(Optional) Name of a tag that identifies the highest priority run rule that was violated the last time SPC performed the selected calculation.</p> <p>If you define this tag as digital, when a violation occurs, SPC writes a 1 to this tag. If you define this tag as message, SPC displays the name of the run rule violated.</p> <p>Valid Entry: standard tag name (default = message) Valid Data Type: digital, message</p>
Dimn LSL Value	<p>(Optional) If you want to override the LSL value you defined in the Sample Plan Calculation Control panel, type the name of a tag that indicates what the lower specification limit was the last</p>

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time SPC performed the selected calculation. To display this limit on the screen and let the operator view and edit this limit at run time, animate this tag as an input-text object in the Application Editor.

When the initial sample plan is loaded or a new sample plan is loaded, the value for this tag is cleared.

Before changing the value of this tag at run time, the operator or another module must first suspend the process. The new value applies to future calculations.

Valid Entry: standard tag name (default = float)

Valid Data Type: analog, longana, float

Dimn USL Value (Optional) If you want to override the USL value you defined in the Sample Plan Calculation Control panel, type the name of a tag that indicates what the upper specification limit was the last time SPC performed the selected calculation. To display this limit on the screen and let the operator view and edit this limit at run time, animate this tag as an input-text object in the Application Editor.

When the initial sample plan is loaded or a new sample plan is loaded, the value for this tag is cleared. New value applies to future calculations.

Before changing the value of this tag at run time, the operator or another module must first suspend the process.

Valid Entry: standard tag name (default = float)

Valid Data Type: analog, longana, float

Dimn Nominal Value (Optional) If you want to override the Nominal value you defined in the Sample Plan Calculation Control panel, type the name of a tag that indicates what the target dimension was the last time SPC performed the selected calculation. To display this limit on the screen and let the operator view and edit this limit at run time, animate this tag as an input-text object in the Application Editor.

When the initial sample plan is loaded or a new sample plan is loaded, the value for this tag is cleared.

Before changing the value of this tag at run time, the operator or another module must first suspend the process. The new value applies to future calculations.

Valid Entry: standard tag name (default = float)

Valid Data Type: analog, longana, float

Calc Size (Optional) If you want to override the subgroup size you defined in the Sample Plan option's Collection Control (SPC) panel, type the name of a tag that indicates the amount of data SPC is to use for the calculation. The tag in this field applies only to the calculation you type in the Calc Name field described above.

Leave this field blank if you want SPC to perform the calculation according to the subgroup size defined in the Sample Plan panels.

If you enter a tag name in this field, SPC does not perform the calculation at the same time as the rest of the calculations based on the subgroup size defined in the Sample Plan panels.

When the initial sample plan is loaded or a new sample plan is loaded, the value for this tag is cleared. If this tag is defined with a default value, that value is cleared when the initial sample plan is loaded or a new sample plan is loaded.

Before changing the value of this tag at run time, the operator or another module must first suspend the process. The new value applies to future calculations.

Valid Entry: standard tag name (default = analog) analog, longana, float

Calc Offset Value (Optional) If you want to override the Calc Offset value you defined in the Sample Plan Calculation Control panel, type the name of a tag that normalizes each calculation result (on a per-calculation basis). SPC subtracts the offset from the calculated value. This value affects the data display only. SPC records and archives the original data without subtracting this value. This field is useful with mean-type calculations such as XBARR and Individual. We recommend you not use it for Standard Deviation and Range calculations.

If you also specify a scale value in the Calc Scale Value field, described below, SPC then subtracts the offset from the calculated value and divides the result by the scale value.

When the initial sample plan is loaded or a new sample plan is loaded, the value for this tag is cleared.

Before changing the value of this tag at run time, the operator or another module must first suspend the process. The new value applies to future calculations.

Valid Entry: standard tag name (default = float)

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Valid Data Type: analog, longana, float

Calc Scale Value (Optional) If you want to override the Calc Scale value you defined in the Sample Plan Calculation Control panel, type the name of a tag that normalizes each calculation result. SPC divides the calculated value by the scale value. This value affects data display only. SPC records and archives the original data values without scaling. We recommend you not use it for Standard Deviation and Range calculations.

When the initial sample plan is loaded or a new sample plan is loaded, the value for this tag will be cleared.

Before changing the value of this tag at run time, the operator or another module must first suspend the process. The new value applies to future calculations.

Valid Entry: standard tag name (default = float)

Valid Data Type: analog, longana, float

Calc Constant Value (Optional. Use this field only for EWMA, Cp, Cpk, or Split calculations.) If you want to override the Calc Constant value you defined in the Sample Plan Calculation Control panel, type a tag name that indicates the value SPC uses for the calculation.

$$CP = \frac{(USL - LSL)}{2 \times cc \times \sigma}$$

$$CPK = \frac{(\bar{X} - LSL)}{cc \times \sigma}$$

Leave this field blank unless you are configuring an EWMA, Cp, CPK, or Split calculation.

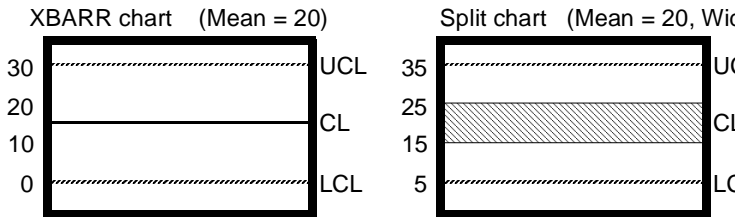
cc = calc constant value.

cc is usually 3σ .

However, you can use other σ values, such as 2σ .

If you are using Cp or Cpk, this tag fits into the Cp and Cpk calculations as shown to the left.

If you are using Split, this tag indicates the width of the center line. The width is the range of values between the two center lines.



If you are using EMWA, this tag represents the λ value, such as $.3\lambda$.

See the Calc Constant field description in “Sample Plan Calculation Control Panel” on page 324 for information about valid constant values for each type of calculation.

When the initial sample plan is loaded or a new sample plan is loaded, the value for this tag is cleared.

Before changing the value of this tag at run time, the operator or another module must first suspend the process. The new value applies to future calculations.

We recommend you use this field only if you're knowledgeable and experienced with adjusting these calculations.

Valid Entry: standard tag name (default = float)

Valid Data Type: analog, longana, float

Points In Control
Limit Calc

(Optional) If you want to override Sample Plan value, type the name of a tag that defines the number of points (calculated values) SPC is to consider when performing the control limit calculation.

Before changing the value of this tag at run time, the operator or another module must first suspend the process. The new value applies to future calculations.

If you are excluding points with assignable cause, fewer points may be used if any are actually excluded.

Valid Entry: standard tag name (default = analog)

- **POWER SPC**
- *Calculation Control Panel*
-
-

Valid Data Type: **analog, longana, float**

- 4 Click on Enter to save the information.**
- 5 Click on Exit to return to the Main Menu.**

PROCESS MONITOR CONTROL PANEL

Perform the following steps to configure the Process Monitor Control panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Processes in the Configuration Manager Main Menu to display the Process Monitor Control panel.

*Run Rule Name [Required]	Run Rule Priority	Run Rule Filter	Run Rule Enable Tag	Run Rule Violation Alarm Tag

SPC Calc Panel Entry

Cancel Enter Exit Next Prev

- 3 Specify the following information for this panel:
Run Rule Name (Required) Type a run rule name. This can be one of the following:

Constant Alphanumeric string of 1 to 16 characters preceded by a single quote that specifies a Run Rule name. The name can be either a standard Western Electric run rule name. See the Glossary entry "Western Electric run rule" for more information or any run rule you define in the Power SPC User-defined Run Rule Configuration panel See Chapter 9, "Customizing your Process," in the *PowerSPC Configuration Guide* for more information.

- **POWER SPC**
- *Process Monitor Control Panel*
-
-

Variable Name of a tag that identifies a run rule. Because you configure run rules on a per-calculation basis, using tags to view or change a run rule configuration affects only one instance of a rule.

If you define a tag in this field, at run time, the operator or another FactoryLink module can change between run rules referenced in the sample plan without suspending the process. However, to change to a run rule not referenced in the sample plan, the operator or a module must first suspend the process.

If the tag value is set to a Run Rule name defined in the Sample Plan Monitor Control panel, then the sample plan values will be overwritten for that run rule.

When the initial sample plan is loaded or a new sample plan is loaded, the value in this tag is cleared but constant values are not be cleared.

Notice that the SPC Calc Panel Entry field at the bottom of this panel contains the Calc Control Tag Set Name you entered in the Calculation Control panel. This name indicates which set of monitor control tags is associated with which set of Calculation Control panel tags.

Valid Data Type: message

Run Rule Priority (Optional) If you configured several run rules for the same calculation, you can type the name of a tag in this field that specifies the order SPC reports run rule violations in. If you leave this field blank and default priorities have not been entered in User Defined Run Rules panel, SPC evaluates the run rules in the order you enter them in the panel.

If you assign priorities and configure only one output-text field tag to display the violated run rule, SPC displays the highest priority run rule violated. Before changing the value of this tag at run time, the operator or another module must first suspend the process.

If this tag is...	Then...
0 (default)	Rules have equal priority.
1 - 32767	1 is the highest; 32767 is the lowest.

Note: After loading the sample plan, run rules with no priorities (0) will have priority of 32767 as output to this tag.

Valid Entry: standard tag name (default = analog)

Valid Data Type: analog, longana, float

Run Rule Filter

(Optional) Name of a tag whose value indicates how you want SPC to report and record run rule violations. Use this field to filter out violations that may occur above and/or below the center value.

If you leave this field blank, SPC uses the run rule filter you defined in the Sample Plan Monitor Control panel.

Before changing the value of this tag at run time, the operator or another module must first suspend the process.

If this tag is either...	Then SPC...
0 or EITHER	(Default) Detects/reports both upper and lower zone violations. If all the Number of Points for Violation lie either above or below the center line, SPC reports run rule violations. This filter can validate a Trend run rule that crosses the center line.
1 or UPPER	Detects/reports only upper zone violations. If all the Number of Points for Violation lie above the center line, SPC reports a run rule violation.

- **POWER SPC**
- *Process Monitor Control Panel*
-
-

If this tag is either...	Then SPC...
2 or LOWER	Detects/reports only lower zone violations. If all the Number of Points for Violation are below the center line, SPC reports a run rule violation.
3 or BOTH	Detects/reports zone violations either above or below the center line. SPC reports run rule violations regardless of the point's proximity to the center.

Valid Entry: standard tag name (default = message)

Valid Data Type: analog, longana, float, message

Run Rule Enable Tag (Optional) Name of a tag that enables or disables the evaluation of the selected run rule.

For each run rule configured for a calculation, SPC reads the value of the Run Rule Enable Tag to determine whether to evaluate the run rule at startup. When this tag is greater than 0, SPC evaluates the run rule.

Before changing the value of this tag at run time, the operator or another module must first suspend the process. If you define this tag as message, the value can be YES and NO.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float, message

Run Rule Violation Alarm Tag (Optional) Name of a tag that indicates when a process violates a run rule. When a process violates a run rule, SPC sets this tag to a value greater than 0. When a process is not violating a run rule, this tag value is 0.

You can configure one violation alarm tag for each run rule being evaluated or you can configure one violation alarm tag for each set of run rules being monitored. If you configure only one tag, any run rule violation triggers the alarm tag.

If you define this tag as message, the value can be YES and NO.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float, message

Run Rule Selection (Optional) Name of a tag that lets the operator select a run rule.
Scroll Tag To scroll through the configured run rules, the operator increments or decrements the value of this tag.

Tie this tag to an output-text object in the Application Editor to display these run rule choices on a graphics screen.

At run time, the operator or another FactoryLink module can trigger this tag without disabling the process.

Valid Entry: standard tag name (default = analog)

Valid Data Type: analog, longana, float

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **POWER SPC**
- *SPC Charts Table*
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-

SPC CHARTS TABLE

After you draw baseline charts using Application Editor, you must link SPC to these charts so they will display the data collected by SPC. You define these links in the SPC Charts table. You can also customize the appearance of the charts (such as colors and line styles) and their run time functionality from this table. There are nine panels to this table:

- **Chart Definition panel**—Define link between a drawing file containing a chart and a sample plan, a process, and a database.
- **Calculation Display panel**—Customize calculations performed on data displayed in a control chart.
- **Raw Data Display panel**—Defines the raw data you want to collect.
- **Auxiliary Data Display panel**—Customize a chart to display auxiliary data.
- **Control Chart panel**—Set up values for the y-axis of a control chart.
- **Bar Chart Display panel**—Customize a bar chart.
- **Chart Information panel**—Define calculations on populations of data.
- **Ad Hoc Chart Calculation panel**—Create a chart that lets the operator view and edit values at runtime.
- **Chart Style panel**—Customize appearance of lines, bar colors, and data points.

CHART DEFINITION PANEL

Perform the following steps to configure the Chart Definition panel:

- 1 Ensure the domain selected is USER in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Charts in the Configuration Manager Main Menu to display the Chart Definition panel.

Chart Object Id Number [Not the Object Name] [Required]	Drawing Name [Required]	*Location Name [Required]	*Subgroup Name [Required]	Historian Database Alias Name [Required]

Buttons: Cancel, Enter, Exit, Next, Prev

3 Specify the following information for this panel:

Chart Object Name (Required) Alphanumeric string of 1 to 16 characters that specifies the object name of the chart. The object name displayed in the title bar of the Chart Animation dialog box when you animated the chart object in the Application Editor.

If the chart object is a subobject of a combined object, type the name of the chart, not the of the combined object.

Valid Entry: alphanumeric string of 1 to 16 characters

Drawing Name (Required) Alphanumeric string of between 1 to 8 characters that specifies the name of the drawing file the chart is displayed on. Do not type the .G file extension (for example, type RUNMGRU).

Valid Entry: alphanumeric string of 1 to 8 characters

- **POWER SPC**
- *Chart Definition Panel*
-
-

Location Name	<p>(Required) Specifies the location of the process that collected the data for this chart. This enables SPC to distinguish between multiple instances of the same process. Be sure to use the same location you used in the Process Definition panel. This can be one of the following:</p> <p>Constant Alphanumeric string of 1 to 16 characters preceded by a single quote that specifies a location, such as a node name, a city, or a floor in the building (for example, 'Pittsburgh).</p> <p>Variable Name of a tag that indicates the location.</p> <p>The location defaults to LOCAL if you leave this field blank.</p> <p>The combination of Location Name and Subgroup Name must be unique in this panel. The combination of Location Name and Subgroup Name specifies the location to log data. If multiple processes contain the same Location Name and Subgroup Name, then the database may be corrupted.</p> <p>Valid Data Type: message</p>
Subgroup Name	<p>(Required) Indicates the name of the subgroup SPC collects the raw data from. Be sure to use the same subgroup name you used in the Process Definition panel. This can be one of the following:</p> <p>Constant Alphanumeric string of 1 to 42 characters preceded by a single quote that specifies a subgroup name.</p> <p>Variable Name of a tag that indicates a subgroup name.</p> <p>Valid Data Type: message.</p>
Historian Database Alias Name	<p>(Required) Alphanumeric string of up to 16 characters that specifies the alias name of the database that you defined in the Database Alias Name field in the Historian Information panel.</p> <p>Valid Entry: alphanumeric string of 1 to 16 characters</p>
Historian Mailbox	<p>(Required) Name of the mailbox tag you defined in the Historian Mailbox field in the Historian Mailbox Information panel. SPC obtains data for the chart from a database through this tag.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: mailbox</p>
Chart Ad Hoc	<p>(Required) Indicates whether this is an actual (also called as monitored) chart or an ad hoc chart. An ad hoc chart is a copy of the currently active control chart the operator changes to run</p>

hypothetical scenarios. Changes to the ad hoc chart do not affect the actual chart or the sample plan. Refer to “Creating an Ad Hoc Chart” in the *Power SPC User Manual*. This can be one of the following:

Constant You can type either YES or NO. If you type YES, this chart will be an ad hoc chart that displays only hypothetical data. If you type NO, this chart will be an actual chart that displays only the actual data.

Variable Name of a tag that contains YES (1) or NO(0). The data type for this tag is message. If you type a tag name, this chart changes back and forth from actual to ad hoc. When the tag is 1, the chart is ad hoc; when the tag is 0, the chart is actual.

Valid Data Type: digital, analog, longana, float or message (default = digital)

Chart Type (Required) Indicates the type of chart to display. This can be one of the following:

XBARR	XBARS	AVG
'STDDEV	'RANGE	'SPLIT
'MOVAVG	'MOVRNG	'EWMA
'INDIV	'C	'U
'NP	'P	'CP
'CPK	'HIST	'PARETO
'PARETO-DEFECTS		

Constant Name of the chart type to display preceded by a single quote. This can be one of the following:

Variable Name of a tag that indicates the chart type. If you type a tag name in this field and specify a default value, SPC loads the default chart at startup. If you do not specify a default value, SPC loads one of the chart types configured in the sample plan.

- **POWER SPC**
- *Chart Definition Panel*
-
-

Also, if you type a tag name in this field, you can configure a Chart Select Scroll Tag to let the operator select from all chart types defined in the sample plan.

Be sure to configure the Dimn or Char Name field.

Refer to the Glossary in this manual for formulas for each calculation.

Valid Data Type: analog, longana, float, or message
(default = message)

Dimn or Char Name (Required) Indicates the dimension or characteristic to display on the chart. This can be one of the following:

Constant Alphanumeric string of 1 to 16 characters preceded by a single quote that specifies the name of the dimension or characteristic to display (for example, 'dent). If you do not precede the name with a single quote, SPC uses it as a tag name.

Variable Name of a tag that identifies the dimension or characteristic to display on the chart. If you type a tag name in this field and specify a default value, SPC loads the default dimension or characteristic at startup. If you do not specify a default value, SPC loads one of the dimensions or characteristics configured in the sample plan.

Also, if you type a tag name in this field, you can configure a Chart Select Scroll Tag, described in *Linking the Components in the Power SPC User Manual*, to let the operator select from all dimensions and characteristics defined in the sample plan.

- * Indicates you want SPC to perform the specified calculation on all characteristics. Only for calculations on characteristics, such as np, p, c, and u.

Be sure to indicate the type of calculation in the Calc Name field, described above.

Valid Data Type: message

Sample Plan Name	<p>(Optional) Indicates the name of a sample plan you defined in the Sample Plan Definition panel. Typically, this is the same sample plan you specified in the Process Definition panel. Use this field only if the chart is an ad hoc chart, Cp or Cpk Chart Info values, or if the operator will scroll through chart types at run time to pick a chart type to be displayed in this chart. This can be one of the following:</p> <p>Constant Alphanumeric string of 1 to 16 characters preceded by a single quote that specifies the sample plan.</p> <p>Variable Name of a tag that indicates the sample plan name</p> <p>Valid Data Type: message</p>
Chart Select Scroll Tag	<p>(Optional) Name of a tag that selects a chart type from all the charts you configured for the active sample plan.</p> <p>The operator can increment or decrement the value of this tag to scroll through a list of configured charts. In the Application Editor, you can tie this tag to a button object to scroll through the available charts, and an output text object to display the names of the available charts.</p> <p>Valid Entry: standard tag name (default = analog)</p> <p>Valid Data Type: analog, longana, float</p>
Chart Message Tag	<p>(Optional) Name of a tag to contain messages about the status and errors SPC encounters at run time when sending data to the Graphics task for display on an SPC chart. You can animate output text fields on a graphics screen to contain these messages. Most messages have less than 50 characters.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: mailbox</p>
Number of Points Tag	<p>(Optional) Name of a tag that indicates the number of data points displayed on the chart.</p> <p>If you animate this tag as an input-text object, the operator can enter the number of points he wants displayed on the chart. If you animate this tag as an output-text object, it displays the current number of points but the operator cannot edit the number of points on the chart using this tag. However, the operator can use zoom buttons to zoom in and out to display points.</p>

- **POWER SPC**
- *Chart Definition Panel*
-
-

This tag corresponds to the number of points you entered in the Initial Chart Duration field on the Chart Animation dialog box when you animated the chart object in the Application Editor. At startup, the chart and this tag show the number of points entered in the Initial Chart Duration field. If the operator edits the value of this tag or zooms in or out, both the chart and this tag show the latest value.

Be sure to enter this tag name in the Tag field of either the Input Text Animation panel or the Output Text Animation dialog.

Valid Entry: standard tag name

Valid Data Type: analog, longana, float

You type tags in the next four fields that let the operator enter dates and times for points he wants to see on the chart and tags that show the date/time of the oldest and newest points on the chart.

If you define these tags as a message data type, the operator needs to enter dates in the input field at run time in the following format:

MM/DD/YY[YY] HH:MM:SS

For example...

12/22/1994 10:22:03

If you define these tags as a long analog data type, the operator can enter the date in any format you define when you draw the input-text field in the Application Editor. Also, be sure to type the same format into the Format field of the Legend Animation dialog.

Input Oldest Date/Time Tag (Optional) Name of a tag that indicates the date and/or time of the oldest point on the chart.

You can use this tag to let the operator request data from this date to the Newest Date/Time Tag value to be displayed on the chart.

You can also use this tag to display the date and time of the oldest point currently showing on the chart.

Use this tag in conjunction with the Newest Date/Time Tag to show the range of points displayed on the chart.

Valid Entry: standard tag name (default = longana)

Valid Data Type: longana, message

Input Newest Date/Time Tag (Optional) Name of a tag that indicates the date and/or time of the newest point on the chart.

You can use this tag to let the operator display data immediately preceding the specified date and time by defining this tag and creating and animating an input object in the Application Editor.

You can also use this tag to merely display the date and time of the newest point currently showing on the chart. To do this, define this tag and create and animate an output object in the Application Editor.

Use this tag in conjunction with the Oldest Date/Time Tag to show the range of points displayed on the chart.

Valid Entry: standard tag name (default = longana)

Valid Data Type: longana, message

Output Oldest Date/Time Tag (Optional) Name of a tag that indicates the date and/or time of the oldest point on the chart. The data type for this tag can be longana or message, depending on the kind of data stored in the tag.

Use this tag in conjunction with the Output Newest Date/Time Tag to show the range of points displayed on the chart.

Valid Entry: standard tag name (default = longana)

Valid Data Type: longana, message

Output Newest Date/Time Tag (Optional) Name of a tag that indicates the date and/or time of the newest point on the chart.

Use this tag in conjunction with the Output Oldest Date/Time Tag to show the range of points displayed on the chart.

Valid Entry: standard tag name (default = longana)

Valid Data Type: longana, message

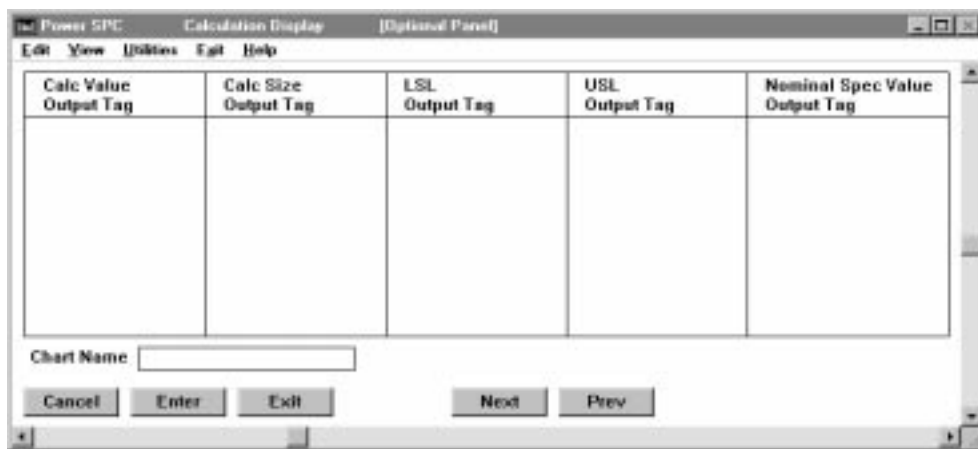
- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **POWER SPC**
- *Calculation Display Panel*
-
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CALCULATION DISPLAY PANEL

Perform the following steps to configure the Calculation Display panel:

- 1 Ensure the domain selected is USER in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Charts in the Configuration Manager Main Menu to display the Calculation Display panel.



- 3 Specify the following information for this panel:

Calc Value Output Tag	(Optional) Name of a tag that displays the calculated result of the selected point. Valid Entry: standard tag name (default = float) Valid Data Type: analog, longana, float
Calc Size Output Tag	(Optional) Name of a tag that displays the calculation size. The value of this tag is always the same as the amount of data represented by each point. For example, if SPC calculates ten raw data values to plot the selected point, the value of this tag is 10. Valid Entry: standard tag name (default = analog) Valid Data Type: analog, longana, float
LSL Output Tag	(Optional) Name of a tag that displays the lower specification limit for the dimension of the selected point. Valid Entry: standard tag name (default = float)

	Valid Data Type: analog, longana, float
USL Output Tag	(Optional) Name of a tag that displays the upper specification limit for the dimension of the selected point. Valid Entry: standard tag name (default = float) Valid Data Type: analog, longana, float
Nominal Spec Value Output Tag	(Optional) Name of a tag that displays the nominal (target) specification for the dimension of the selected point. Valid Entry: standard tag name (default = float) Valid Data Type: analog, longana, float
LCL Output Tag	(Optional) Name of a tag that displays the lower control limit for the dimension of the selected point. Valid Entry: standard tag name (default = float) Valid Data Type: analog, longana, float
UCL Output Tag	(Optional) Name of a tag that displays the upper control limit for the dimension of the selected point. Valid Entry: standard tag name (default = float) Valid Data Type: analog, longana, float
Center Value Output Tag	(Optional) Name of a tag that displays the center value for the dimension of the selected point. Valid Entry: standard tag name (default = float) Valid Data Type: analog, longana, float
Date/Time Output Tag	(Optional) Name of a tag that displays the date and time at which SPC calculated the value of the selected point. If you define this tag as a message data type, the date and time are displayed in the following format: MM/DD/YY[YY] HH:MM:SS for example, 12/22/1994 10:22:03 If you define this tag as a long analog data type, the date and time are displayed in any format you define when you draw the output-text field in the Application Editor. Valid Entry: standard tag name (default = longana) Valid Data Type: longana, message

- **POWER SPC**

- *Calculation Display Panel*

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Raw Data Page Tag (Optional) Name of a tag that lets the operator page through the raw data associated with the selected point. SPC displays this data in the raw data tags you define in the next panel, Raw Data Display. The number of raw data tags you define determines the size of the raw data page. As the operator increments or decrements the value of the Raw Data Page Tag by 1, SPC displays a new page of raw data values in the tags. This tag works similarly to a Page Up or Page Down key.

Valid Entry: standard tag name (default = analog)

Valid Data Type: analog, longana, float

Violated Run Rule Name Output Tag (Optional) Name of a tag that displays the run rules violated at the selected point. This tag displays the highest priority rule violated. You can configure a Violated Run Rule Scroll Tag in the next field to enable the operator to scroll through other run rule violations.

Valid Entry: standard tag name

Valid Data Type: message

Violated Run Rule Scroll Tag (Optional) Name of a tag that lets the operator scroll through the names of the run rules violated for the selected point. The violated run rule names displayed in the output field are tied to the Violated Run Rule Name Output Tag.

Valid Entry: standard tag name (default = analog)

Valid Data Type: analog, longana, float

Cause Code Class (Optional) Specifies a cause code class to be displayed or edited for the selected point. This can be one of the following:

Constant An alphanumeric name of 1 to 16 characters preceded by a single quote that specifies a cause code class.

Variable Name of a tag that contains the class. Define message as the data type for this tag.

Refer to “Cause Code Definition Panel” on page 399 for information about cause code classes.

Cause Code Name Tag (Optional) Name of a tag that displays and allows the operator to edit the cause code assigned to the selected point.

Valid Entry: standard tag name

Valid Data Type: message

Comment Tag (Optional) Name of a tag that displays and allows the operator to edit comments about the selected point. Comments can contain up to 56 characters.

Valid Entry: **standard tag name**

Valid Data Type: **message**

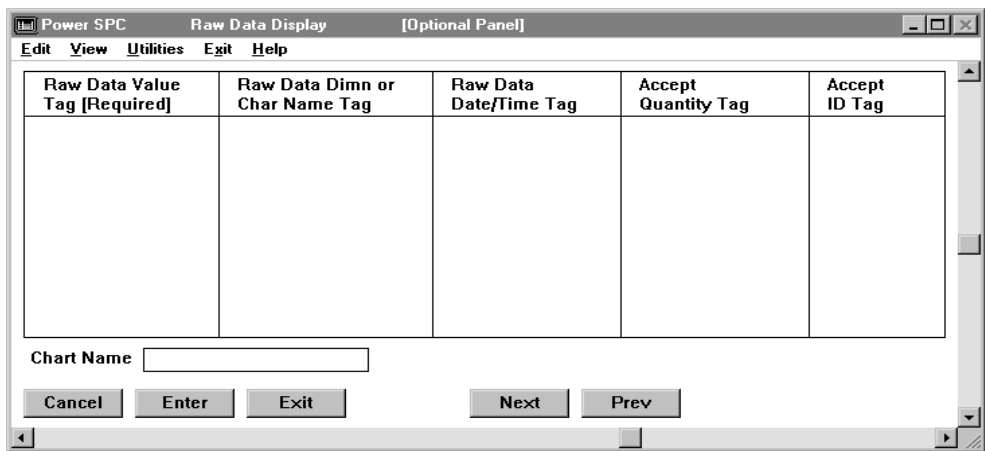
- 4** Click on Enter to save the information.
- 5** Click on Exit to return to the Main Menu.

- **POWER SPC**
- *Raw Data Display Panel*
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-

RAW DATA DISPLAY PANEL

Perform the following steps to configure the Raw Data Display panel:

- 1 Ensure the domain selected is USER in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Charts in the Configuration Manager Main Menu to display the Raw Data Display panel.



- 3 Specify the following information for this panel:

Raw Data Value Tag	<p>(Required) Name of a tag that displays the raw data values used to calculate the selected point's value.</p> <p>Valid Entry: standard tag name (default = float)</p> <p>Valid Data Type: digital, analog, longana, float, message</p>
Raw Data Dimn or Char Name Tag	<p>(Optional) Name of a tag that displays the dimension or characteristic name for the corresponding raw data value.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: message</p>
Raw Data Date/Time Tag	<p>(Optional) Name of a tag that displays the date and time for the corresponding raw data value.</p> <p>If you define this tag as a message data type, the date and time are displayed in the following format:</p>

YY/MM/DD HH:MM:SS

for example,

94/12/22 12:22:03

If you define this tag as a long analog data type, the date and time are displayed in any format you define when you draw the output-text field in the Application Editor.

Valid Entry: standard tag name

Valid Data Type: longana, message (default = longana)

Accept Quantity Tag (Optional) Name of a tag that indicates the number of units measured or inspected for the current point. You can define this tag and animate it as an output-text object to display this value on a graphics screen.

Valid Entry: standard tag name (default = analog)

Valid Data Type: analog, longana, float, message

Accept ID Tag (Optional) Name of a tag that indicates which transaction the data for the selected point belongs.

Valid Entry: standard tag name (default = analog)

Valid Data Type: analog, longana, float, message

Auxiliary Table Name (Required for Auxiliary Data Display panel) Alphanumeric string of 1 to 16 characters if you want to display the auxiliary data that corresponds to the raw data value specified in this panel. This name is displayed at the bottom of the next panel, Auxiliary Data Display and identifies the group of tags that display the auxiliary data. This field lets you associate multiple auxiliary data tags with each raw data tag. Define the auxiliary data tags in the Auxiliary Data Display panel.

Leave this field blank if you are not collecting or displaying auxiliary data. Also, leave the Auxiliary Data Display panel blank.

Valid Entry: Alphanumeric string of 1 to 16 characters

Auxiliary Page Position Tag (Optional) Name of a tag that lets the operator page through the auxiliary data associated with the raw data tag specified in this panel. SPC displays this auxiliary data in the auxiliary data tags you define in the next panel, Auxiliary Data Display. The number of auxiliary data tags you define determines the size of the auxiliary data page. As the operator increments or decrements the value of the Auxiliary Page Position Tag, SPC displays a new page of auxiliary data values in the tags.

- **POWER SPC**
- *Raw Data Display Panel*
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Also, be sure to complete the Auxiliary Table Name field.

Valid Entry: standard tag name (default = analog)

Valid Data Type: analog, longana, float

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

AUXILIARY DATA DISPLAY PANEL

Perform the following steps to configure the Auxiliary Data Display panel:

- 1 Ensure the domain selected is USER in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Charts in the Configuration Manager Main Menu to display the Auxiliary Data Display panel.

*Auxiliary Field Alias Name [Required]	Auxiliary Data Tag [Required]

Auxiliary Table Name [From Previous Panel]

- 3 Specify the following information for this panel:

Auxiliary Field Alias Name (Required) Indicates the alias name of the database column containing the auxiliary data you want SPC to display in the Auxiliary Data Tag output field on the graphics screen. You defined this alias name in the Auxiliary Field Alias Name field in the Auxiliary Schema Definition panel. Refer to "Defining Custom Cause Codes, Run Rules, and Auxiliary Database Columns," in this manual.

This can be one of the following:

Constant Alphanumeric string of 1 to 16 characters preceded by a single quote that defines the alias name.

Variable Name of a tag that contains the alias name.

Valid Data Type: message

- **POWER SPC**
- *Auxiliary Data Display Panel*
-
-

Auxiliary Data Tag (Required) Name of a tag that displays the auxiliary data value.

At run time, SPC displays the value that corresponds to the name in the Auxiliary Field Alias Name tag.

Valid Entry: **standard tag name**

Valid Data Type: **message**

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

CONTROL CHART PANEL

Perform the following steps to configure the Control Chart panel:

- 1 Ensure the domain selected is USER in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Charts in the Configuration Manager Main Menu to display the Control Chart panel.

Edit Mode Toggle Tag	Edit Mode Completion Tag	*Y-Axis Minimum	*Y-Axis Maximum	Y-Axis Rescale Tag

Chart Name

- 3 Specify the following information for this panel:

Edit Mode Toggle Tag (Optional) Name of a tag that lets the operator toggle in and out of an edit session. While in edit mode, the operator can edit cause codes, cause codes classes, comments, raw data values, and auxiliary data values. When the value of this tag is greater than 0 (OFF), SPC enters edit mode. When the value is 0 (OFF), SPC exits edit mode and makes the changes.

Valid Entry: standard

Valid Data Type: tag name (default = digital)

Valid Data Type: digital, analog, longana, float

Edit Mode Completion Tag (Optional) Name of a tag that indicates when edits are complete and SPC has applied the changes to the database. When changes are complete, SPC sets the value of this tag to 1 (ON). This tag is useful if the operator or another FactoryLink task needs to know

- **POWER SPC**
- *Control Chart Panel*
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when SPC writes the changed values to the database. You can tie this tag to an object on a graphics screen or use it to trigger a Math & Logic procedure.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float, message

Use the next four fields to set up the values and divisions displayed on the y-axis of the chart. You must configure these fields if your chart has a Y legend. Leave these fields blank if your chart does not have a Y legend.

Type constant values in these fields if you want the values on the Y legend to always remain the same. Type the same tags you typed in the Maximum Tag and Minimum Tag fields on the Legend Animation dialog for the Y legend object if you want the values on the Y legend to change in sync with the data on the chart or if you want the operator to be able to change the values,

Y-Axis Minimum (Optional) Specifies the lowest value on the y-axis of the chart. This can be one of the following:

Constant Any numeric value.

Variable Name of a tag that contains this value. If you type a tag name, the operator can use it at run time to change the lowest value.

If you type a tag name, type the same name you typed in the Minimum Tag field on the Legend Animation dialog when you animated the legend object in the Application Editor. Refer to the *PowerSPC Configuration Guide* for more information.

If you define this tag as message, its value will still be a number.

Valid Data Type: analog, longana, float or message (default = float)

Y-Axis Maximum (Optional) Specifies the highest value on the y-axis of the chart. This can be one of the following:

Variable Any numeric value.

Constant Name of a tag that contains this value. If you type a tag name, the operator can use it at run time to change the highest value.

If you type a tag name, type the same name you typed in the Maximum Tag field on the Legend

Animation dialog when you animated the legend object in the Application Editor. Refer to the *PowerSPC Configuration Guide* for more information.

The data type for this tag can be data stored in the tag.

If you define this tag as message, its value will still be a number.

Valid Data Type: analog, long analog, float or message (default = float)

Y-Axis Rescale Tag (Optional) Name of a tag that moves the range of values up or down on the y-axis of the chart. If you type a tag name, the operator can enter a percentage at run time to adjust both the minimum and maximum values on the y-axis.

Valid Entry: standard tag name (default = analog)

Valid Data Type: analog, longana, float

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **POWER SPC**
- *Bar Chart Display Panel*
-
-

BAR CHART DISPLAY PANEL

Perform the following steps to configure the Bar Chart Display panel:

- 1 Ensure the domain selected is USER in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Charts in the Configuration Manager Main Menu to display the Bar Chart Display panel.

*Bar Chart Size [Required]	*Display Frequency	*Minimum Frequency Value	Minimum Frequency Alarm Tag

Chart Name

- 3 Specify the following information for this panel:

Bar Chart Size

(Required) Indicates the number of raw data values distributed into the bars of the histogram. This can be one of the following:

Constant

Any positive non-zero number. The default is 10.

Variable

Name of a tag that indicates the number. If you type a tag name, the operator or another FactoryLink task can change the number of values at run time.

Valid Entry: standard tag name (default = analog)

Valid Data Type: digital, analog, longana, float or message

Display Frequency

(Optional) Specifies whether the numeric value representing the frequency for the bar is to be displayed above the bar on the chart. This can be one of the following:

	<p>Constant Either YES or NO. If you type YES, values are displayed above the bar. If you type NO, values are not displayed. The default is YES.</p> <p>Variable Name of a tag that indicates YES (1) or NO (0).</p> <p>Valid Entry: standard tag name (default = digital)</p> <p>Valid Data Type: digital, analog, longana, float or message</p>
Minimum Frequency Value	<p>(Optional) For a Pareto-defect chart, specifies the minimum number of defects that must occur for a bar to be displayed.</p> <p>For a Pareto chart, specifies the minimum number of units that must be defective for a bar to be displayed.</p> <p>For a histogram, specifies the minimum number of measurements that must fall within a cell for a bar to be displayed.</p> <p>This can be one of the following:</p> <p>Constant Any positive number beginning with zero (0).</p> <p>Variable Name of a tag that indicates the value.</p> <p>SPC displays a bar for any defect that occurs, for any unit that is defective, or for any measurement if you leave this field blank.</p> <p>You can use this field in conjunction with the Minimum Frequency Alarm Tag field to notify the operator or another FactoryLink task any time a defect, a defective unit, or a measurement within a cell occurs fewer times than specified by the value in this field.</p> <p>Valid Entry: standard tag name (default = analog)</p> <p>Valid Data Type: digital, analog, longana, float or message</p>
Minimum Frequency Alarm Tag	<p>(Optional) Name of an alarm tag that notifies the operator or another FactoryLink task if a defect, a defective unit, or a measurement is displayed fewer times than you specified in the Minimum Frequency Value field.</p> <p>Valid Entry: standard tag name (default = digital)</p> <p>Valid Data Type: digital, analog, longana, float</p>
Maximum Frequency Value	<p>(Optional) For a Pareto-defect chart, specifies the maximum number of defects to show on the chart for the characteristic being charted.</p> <p>For a Pareto chart, specifies the maximum number of defective units to show on the chart for that characteristic.</p>

- **POWER SPC**
- *Bar Chart Display Panel*
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For a histogram, specifies the maximum number of measurements within the same cell to show on the chart for that characteristic.

This can be one of the following:

- Constant Any positive number beginning with zero (0).
- Variable Name of a tag that indicates the value. If the number of defects, the number of defective units, or the number of measurements within a cell exceeds this value, the bar remains at the maximum value. You can use this field, however, in conjunction with the Maximum Frequency Alarm Tag field to define an alarm that notifies the operator or another FactoryLink task if a value exceeds this limit.

The chart shows all values greater than 0 if you leave this field blank.

Valid Entry: standard tag name (default = analog)

Valid Data Type: digital, analog, longana, float, or message

Maximum Frequency Alarm Tag (Optional) Name of an alarm tag that notifies the operator or another FactoryLink task if more defects occur, if more units are defective, or if more measurements occur in a cell than you specified in the Maximum Frequency Value field, described above. The alarm notifies the operator one of the bars exceeds the maximum.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog, longana, float

Histogram Minimum Value (Optional) Specifies the lower limit sample values must fall above to be displayed on the chart. This can be one of the following:

- Constant Any number.
- Variable Name of a tag that indicates the value. The value in this field, along with the value in the Histogram Maximum Value field, described below, determines the range of data displayed in the Histogram. To narrow or widen the view of the data, the operator adjusts one or both of the values.

SPC subtracts the value in this field from the value in the Histogram Maximum Value field to determine the range of data to display.

SPC divides the range by the number of bars displayed to determine the range of data for each bar on the chart. If you leave both this field and the Histogram Maximum Value field blank, SPC uses the minimum and maximum values displayed on the chart.

You can use this field in conjunction with the Histogram Minimum Alarm Tag field to notify the operator or another FactoryLink task any time a sample falls below the value in this field.

Valid Entry: standard tag name (default = float)

Valid Data Type: digital, analog, longana, float or message

Histogram Minimum Alarm Tag (Optional) Name of an alarm tag that notifies the operator or another FactoryLink task if a sample value falls below the minimum you specified in the Histogram Minimum Value field.

Valid Entry: standard tag name

Valid Data Type: digital, analog, longana, float (default = digital)

Histogram Maximum Value (Optional) Specifies the upper limit sample values must fall below. This can be one of the following:

Constant Any number.

Variable Name of a tag that indicates the value. digital, analog, longana, float or message

SPC subtracts the value in the Histogram Minimum Value field from the value in this field to determine the range of data to display.

SPC divides the range by the number of bars displayed to determine the range of data for each bar on the chart. If you leave both this field and the Histogram Minimum Value field blank, SPC uses the minimum and maximum values displayed on the chart.

You can use this field in conjunction with the Histogram Maximum Alarm Tag field to notify the operator or another FactoryLink task any time a sample falls above the value in this field.

Valid Entry: standard tag name (default = float)

Valid Data Type: digital, analog, longana, float, or message

Histogram Maximum Value Alarm Tag (Optional) Name of an alarm tag that notifies the operator or another FactoryLink task if a sample value falls above the maximum you specified in the Histogram Maximum Value field.

- **POWER SPC**

- *Bar Chart Display Panel*

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Valid Entry: **standard tag name (default = digital)**

Valid Data Type: **digital, analog, longana, float**

Histogram Bar
Rescale Tag

(Optional) Name of a tag that lets the operator or another FactoryLink module change the range of data shown in the bars displayed on a histogram. This is useful if the operator wants to break the bars up into smaller ranges to see a more detailed distribution of values. The operator enters a percentage value.

Valid Entry: **standard tag name (default = digital)**

Valid Data Type: **digital, analog, longana, float, message**

Clear Chart Trigger
Tag

(Optional) Name of a tag that lets the operator or another FactoryLink task clear a bar chart of data and begin accumulating data as SPC collects it.

Valid Entry: **standard tag name (default= digital)**

Valid Data Type: **digital, analog, longana, float, message**

X Legend Object
Name

(Optional) Alphanumeric string of 1 to 100 characters that defines the X legend's object name. This legend shows the middle value of each bar or the defect name for Pareto and Pareto-defect charts.

Valid Entry: **alphanumeric string of 1 to 100 characters**

4 Click on Enter to save the information.

5 Click on Exit to return to the Main Menu.

CHART INFORMATION PANEL

Perform the following steps to configure the Chart Information panel:

- 1 Ensure the domain selected is USER in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Charts in the Configuration Manager Main Menu to display the Chart Information panel.

*Chart Value Type [Required]	Chart Value Output Tag [Required]

Chart Name

- 3 Specify the following information for this panel:

*Chart Value Type (Required) Indicates the type of calculation you want SPC to perform on the chart. This can be one of the following:

Constant Name of calculation preceded by a single quote.
Population calculations fall into two categories:

Population Raw Data: SPC performs the specified calculation, such as Range or C, on the raw data for all points currently showing on the chart. This can be one of the following:

'STDDEV	'RANGE	'MINIMUM
MAXIMUM	KURTOSIS	'SKEWNESS

- **POWER SPC**
- *Chart Information Panel*
-
-

'GRANDX	'AVG	'CP
CPK	'C	'U
P		'NP

Population Bar: SPC averages all of the calculated values points) currently showing on the chart. This can be one of the following:

'SBAR'RBAR'POINTSBAR

If you type 'POINTSBAR, SPC performs the appropriate Bar calculation for the chart type. Refer to the Glossary definition for details about POINTSBAR, VariableName of a tag that contains a calculation name.

Type a tag name if you want the operator to be able to change calculations.

Cp and Cpk require LSL and USL specified in the Sample Plan's Collection Control f. Refer to the Chart Definition panel to specify a Sample Plan for a chart Chart Value Output Tag.

	Valid Entry: standard tag name (default = message)
	Valid Data Type: analog, longana, float or message
Chart Value Output Tag	(Required) Name of a tag that displays the result of the calculation selected in the Chart Value Type field. This result is for the population of data currently shown in the chart.
	Valid Entry: standard tag name (default = float)
	Valid Data Type: digital, analog, longana, float, message

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

AD HOC CHART CALCULATION PANEL

Perform the following steps to configure the Ad Hoc Chart Calculation panel:

- 1 Ensure the domain selected is USER in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Charts in the Configuration Manager Main to display the Ad Hoc Chart Calculation panel.

Suspend Changes Tag	Calc Size	Control Limit Trigger Tag	LCL Value

Chart Name

- 3 Specify the following information for this panel:

Suspend Changes Tag (Optional) Name of a tag that lets the operator change multiple values before SPC applies the changes to the chart. This saves time since SPC doesn't have to recalculate the chart each time the operator enters a new value.

If you don't define this tag, SPC recalculates all data on the chart each time the operator enters a new value.

To suspend changes until all changes are complete, the operator toggles into suspend-change mode (by changing this tag to 1(ON), makes all desired edits, and toggles back out of suspend-change mode (by changing the tag back to 0 (OFF)). Then (when this tag is 0), SPC applies all changes to the chart at once.

Valid Entry: standard tag name

Valid Data Type: digital, analog, longana, float, message
(default = digital)

- **POWER SPC**

- *Ad Hoc Chart Calculation Panel*

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Calc Size	<p>(Optional) Name of a tag that determines the amount of data SPC uses for the calculation selected for the current chart.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: digital, analog, longana, float, message (default = analog)</p>
Control Limit Trigger Tag	<p>(Optional) Name of a tag that determines the amount of data to use when calculating control limits. This tag specifies how many points to include in the calculation.</p> <p>Because the operator can change the subgroup size on an ad hoc chart, SPC does not exclude data associated with a point that has an assignable cause.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: digital, analog, longana, float (default = digital)</p>
LCL Value	<p>(Optional) Name of a tag that determines the lower control limit for the data displayed on the chart.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog, longana, float (default = float)</p>
UCL Value	<p>(Optional) Name of a tag that determines the upper control limit for the data displayed on the chart.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog, longana, float (default = float)</p>
Center Value	<p>(Optional) Name of a tag that determines the center value for the data displayed on the chart.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog, longana, float (default = float)</p>
Dimn LSL Value	<p>(Optional) Name of a tag that determines the lower specification limit for the dimension displayed on the chart. This tag does not apply to characteristics.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog, longana, float (default = float)</p>
Dimn USL Value	<p>(Optional) Name of a tag that determines the upper specification limit for the dimension displayed on the chart. This tag does not apply to characteristics.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog, longana, float (default = float)</p>

Dimn Nominal Value	<p>(Optional) Name of a tag that determines the target measurement for the dimension. This tag does not apply to characteristics.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog, longana, float (default = float)</p>
Calc Offset	<p>(Optional) Name of a tag that normalizes each calculation result. SPC subtracts the offset from the calculated value. This field is useful with mean-type calculations like XBARR or INDIV.</p> <p>If you also type a scale value in the Calc Scale field, described below, SPC then divides the adjusted result by the scale value.</p> <p>Refer to the Calc Offset field description in Calculation Control Panel in this manual for an example.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog, longana, float (default = float)</p>
Calc Scale	<p>(Optional) Name of a tag that normalizes each calculation result. SPC divides the calculated value by the scale value.</p> <p>If you also type an offset value in the Calc Offset field, SPC subtracts the offset from the calculated value and then divides the result by the scale value.</p> <p>Refer to the Calc Scale field description in Calculation Control Panel in this manual for an example.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog, longana, float (default = float)</p>
Calc Constant	<p>(Optional; only for use with EWMA, Cp, Cpk, and Split calculations) Name of a tag that adjusts the constant value SPC uses in the specified calculation. For example, the EWMA calculation uses a λ value. If you want the operator to be able to change the λ value the EWMA calculation uses, type a tag in this field.</p> <p>Refer to the Calc Constant field description in Calculation Control Panel in this manual for information about valid constant values for each type of calculation.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: analog, longana, float (default = float)</p>
<p>Caution: We recommend you use this field only if you're knowledgeable and experienced with adjusting these calculations.</p>	

- **POWER SPC**
- *Ad Hoc Chart Calculation Panel*
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Run Rule Scroll Tag (Optional) Name of a tag that lets the operator scroll through a list of run rules and select the run rule he or she wants to display and control.

Use this tag in conjunction with the next four fields, described below.

Valid Entry: standard tag name

Valid Data Type: analog, longana, float (default = analog)

Run Rule Name Tag (Optional) Name of a tag that displays the run rule SPC performs on the selected chart and calculation.

Valid Entry: standard tag name

Valid Data Type: message

Run Rule Enable Tag (Optional) Name of a tag that controls the evaluation of the selected run rule for a chart. When this tag is 1, the run rule is enabled. When this tag is 0, the run rule is disabled.

Valid Entry: standard tag name

Valid Data Type: digital, analog, longana, float, message (default = digital)

Run Rule Priority Tag (Optional) Name of a tag that displays and controls the priority of the selected run rule.

If the Value of This Tag Is:	Then...
0 (default)	Rules have equal priority.
1 - 32,767	1 is the highest; 32,767 is the lowest.

Valid Entry: standard tag name

Valid Data Type: digital, analog, longana, float, message (default = analog)

Run Rule Filter Tag (Optional) Name of a tag that displays and controls a run rule's filter. Use this tag to filter out violations that may occur above and below the center value.

If the value of this tag is...	Then SPC...
EITHER	(Default) Detects and reports both upper and lower zone violations. If all the Number of Points for Violation lie either above or below the center line, SPC reports run rule violations. This filter can validate a Trend run rule that crosses the center line.
UPPER	Detects and reports only upper zone violations. If all the Number of Points for Violation are above the center line, SPC reports a run rule violation.
LOWER	Detects and reports only lower zone violations. If all the Number of Points for Violation lie below the center line, SPC reports a run rule violation.
BOTH	Detects and reports zone violations either above or below the center line. SPC reports run rule violations regardless of the point's proximity to the center.

Valid Entry: **standard tag name**

Valid Data Type: **digital, analog, longana, float, message**
(default = analog)

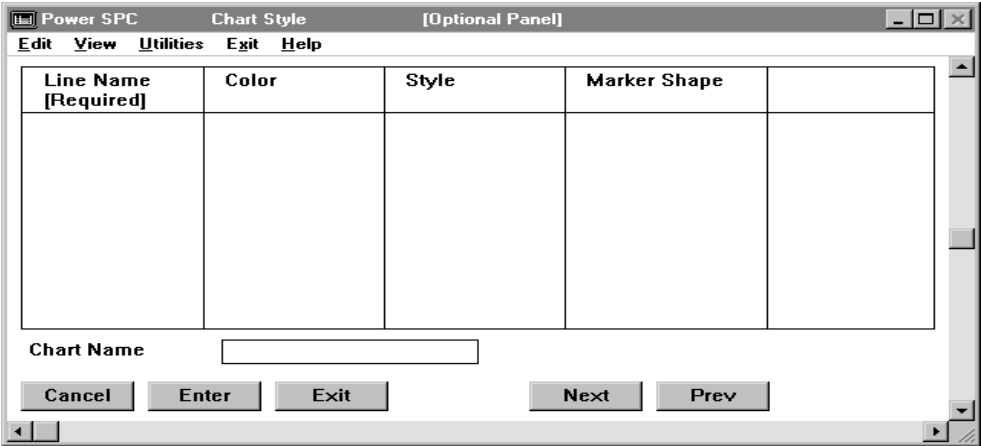
- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **POWER SPC**
- *Chart Style Panel*
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CHART STYLE PANEL

Perform the following steps to configure the Chart Style panel:

- 1 Ensure the domain selected is USER in the Configuration Manager Domain Selection box.
- 2 Choose Power SPC Charts in the Configuration Manager Main Menu to display the Chart Style panel.



- 3 Specify the following information for this panel:

Line Name

(Required) Line type for each line you want displayed on the chart. This can be one of the following:

DATA_LINE

Line connecting the calculated data points or in a bar chart change the colors of the bars.

VIOLATION

Line connecting the calculated data points that have violated a run rule.

UCL

Upper Control Limit line.

CENTER

Center Control Limit line.

LCL

Lower Control Limit line.

USL

Upper Specification Line.

NOMINAL

Nominal (target) Specification Line.

LSL Lower Specification Line.

SIGMA Sigma (standard deviation) lines at ± 1 sigma and ± 2 sigma.

FREQUENCY Frequency line.

To customize the color of the bars on a bar chart, choose DATA_LINE as the line name. Then, fill out the Color field.

Color (Optional) Color for each line (and data point) on the chart. This can be one of the following:

BLACK	CYAN	BLUE
MAGENTA	RED	YELLOW
GREEN	WHITE	

Style (Optional) Line style for each line on the chart. This can be one of the following:

SOLID	DOT_DASHED	DOTTED
NO_LINE	DASHED	

Marker Shape (Optional) Shape you want plotted at each calculated data point on the data line. Type a shape only for the DATA_LINE and VIOLATION entries in the Line Name field. SPC ignores this field for all other types of lines.

BOX	CROSS	PLUS
TRIANGLE	CIRCLE	DIAMOND
NONE		

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **POWER SPC**
- *User-Defined Cause Code Table*
-
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USER-DEFINED CAUSE CODE TABLE

You can customize your process by defining:

- Custom cause codes
- Run rules
- Storage of auxiliary data

Process customization is configured from the User-Defined Cause Code table. There are three panels to this table:

- **Cause Code Definition panel**—Defines codes that identify the causes of changes or adjustments that commonly occur during a process, such as a raw material change or a shift change. Operators can use these cause codes to assign a cause to any point on a chart, such as one that violates a run rule or goes out of control, and to display the cause description on screen.
- **Run Rule Definition panel**—Defines run rules that specify criteria for judging whether or not a process is out of control.
- **Auxiliary Schema Definition panel**—Defines where to store auxiliary data collected.
- **Auxiliary Schema Control panel**—Defines the update trigger for auxiliary data.

CAUSE CODE DEFINITION PANEL

Perform the following steps to configure the Cause Code Definition panel:

- 1 Choose Power SPC User-Defined Cause Codes in the Configuration Manager Main Menu to display the Cause Code Definition panel.

Cause Code Name [Required]	Cause Code Class [Required]	Assignable Cause?	Description

Buttons: Cancel, Enter, Exit

- 2 Specify the following information for this panel:

Cause Code Name (Required) Alphanumeric string of between 1 to 16 characters that specifies the unique cause code name.

Valid Entry: alphanumeric string of between 1 to 16 characters

Cause Code Class (Required) Alphanumeric string of between 1 to 16 characters that specifies the name of the class to which the cause code is to belong.

Valid Entry: alphanumeric string of between 1 to 16 characters

Assignable Cause? (Optional) Indicates whether this cause code is an assignable cause. This can be one of the following:

YES SPC will not use the data for that point in the control limit calculations. This is the default.

If you classify the code as an assignable cause, assign the code to a point on a chart, and enter YES in the field. You must also specify YES in the

- **POWER SPC**
- *Cause Code Definition Panel*
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“Exclude Data with Assignable Cause?” field in the Sample Plan panel of the Power SPC Sample Plans option.

NO SPC uses the data.

An assignable cause is the cause of a variation in a non-random process; that is, an operator can determine and perhaps eliminate the source of the variation (for example, a power outage or equipment malfunction).

If you configure the Sample Plan to exclude data associated with points that have an assignable cause, SPC uses this field to determine which cause codes will result in data being excluded from all control limit calculations. For more information, refer to Chapter 5, “Creating a Power SPC Sample Plan,” in the *PowerSPC Configuration Guide*.

Description (Optional) Describes the cause code. You can assign and enter an alphanumeric string of between 1 to 48 characters that specifies the description of what the cause code means. SPC does not use this information and it does not display this information on screen for the operator to view.

For example, if one of the causes of variation in your process is known to be a power spike, you can configure a cause code as shown.

Sample Cause Code Definition panel	
Field Name	Sample Entry
Cause Code Name	SPIKE
Cause Code Class	POWER
Assignable Cause?	YES
Description	A surge or spike from Power Supply

- 3 Click on Enter to save the information.
- 4 Click on Exit to return to the Main Menu.

RUN RULE DEFINITION PANEL

Note: If you use only the system-defined Western Electric run rules, you do not need to configure this panel.

Perform the following steps to configure the Run Rule Definition panel:

- 1 Choose Power SPC User-Defined Cause Codes in the Configuration Manager Main Menu to display the Run Rule Definition panel.

Run Rule Name [Required]	Run Rule Type [Required]	Run Rule Zone [Required]	Number of Points for Violation [Required]	Number of Points to Investigate [Required]

Cancel Enter Exit

- 2 Specify the following information for this panel:

Run Rule Name (Required) Alphanumeric string of between 1 to 16 characters that specifies the unique run rule name. Be sure to use a unique name for each run rule. If you use the name of an already defined run rule, FactoryLink will overwrite the previous definition, including the Western Electric defaults.

Valid Entry: alphanumeric string of between 1 to 16 characters

Run Rule Type (Required) Indicates how you want SPC to evaluate the points. For example, where must a point fall in relation to a line or zone to violate the run rule? Within, outside, etc. This can be one of the following:

BOUNDARY To violate the run rule, points above the center line must fall within or above the boundary line set by the next field, Run Rule Zone. Points below the

- **POWER SPC**
- *Run Rule Definition Panel*
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center line must fall within or below the boundary line.

ZONE To violate the run rule, the points must fall within the zone specified by the Run Rule Zone (this includes values on the zone line).

TREND To violate the run rule, the points must consecutively continue to increase or decrease. (The Western Electric TREND run rule looks for seven points.)

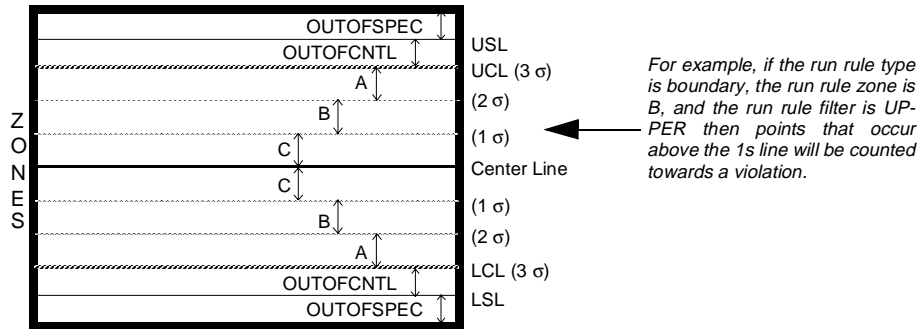
You can filter points in relation to the center line. Be sure to specify filters in the Sample Plan panels.

Run Rule Zone (Required) Zone to which you want SPC to apply the Run Rule Type, described above. For example, for a BOUNDARY-type rule, a value must fall beyond the zone you type in this field. Zones are displayed in the drawing below.

If you want SPC to apply ZONE_A, ZONE_B, ZONE_C, or ZONE_OUTOFCNTL to a run rule, we recommend you define control limits in the Sample Plan option's Calculation Control panel. Define them in the Pre-Control LCL, Pre-Control UCL, and Pre-Control Center fields.

If you want SPC to apply ZONE_OUTOFSPEC to a run rule, we recommend you define specification limits in the same panel, Calculation Control. Define them in the LSL for Calculation, USL for Calculation, and Nominal for Calculation fields. This can be one of the following:

ZONE_A	ZONE_B	ZONE_C
ZONE_OUTOFCNTL		ZONE_OUTOFSPEC



Number of Points for Violation (Required) Unique number between 1 and 99 that specifies the number of points that must fail the evaluation of the type and zone you just defined to classify the latest point as a violation of this run rule.

Valid Entry: unique number between 1 and 99

Number of Points to Investigate (Required) Unique number between 1 and 99 that specifies the maximum number of points SPC must investigate or evaluate for a violation.

Valid Entry: unique number between 1 and 99

Run Rule Display Name (Optional) Unique number between 1 and 99 that specifies the name of the run rule, such as 9OF12. Whenever this run rule is violated, this name is displayed in the output-text field you defined in the Violated Run Rule Name Output Tag field from the Processes option's panel Monitor Control. You may want to display a shorter code rather than the entire name.

You can assign and enter a 1 to 32 character alphanumeric string (you can use spaces between characters).

Default Run Rule Priority (Optional) If you want SPC to report the run rule violations in a specific order, type a priority value in this field. Run Rule priorities configured in the Sample Plan panels will override these default priorities.

For example, you may consider your custom rules most important and want those displayed first in the Run Rule Violation Alarm Tags you define in the Process option's Monitor Control panel.

You can assign and enter a 1 - 32767 character alphanumeric string (with 1 having the highest priority and 32767 the lowest).

- **POWER SPC**
- *Run Rule Definition Panel*
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The following table shows how the five standard Western Electric run rules are configured. Use these as a guide for the user-defined run rules.

Western Electric Run Rule	Run Rule Description	Zone	Type	Number of Points for Violation	Number of Points to Investigate	*Filter	Default Priority
2OF3	2 out of 3 points lie on one side of the Center Line in Zone A or beyond.	A	BOUNDARY	2	3	BOTH	2
4OF5	4 out of 5 points lie on one side of the Center Line in Zone B or beyond.	B	BOUNDARY	4	5	EITHER	3
TREND	7 points in a row are rising or falling on either side of the center line.	C	TREND	7	7	EITHER	5
8CONS	8 points in a row lie on one side of the Center Line.	C	BOUNDARY	8	8	BOTH	4
3SIGMA	One or more points lie outside control limits.	Out of Control	BOUNDARY	1	1	BOTH	1
* Define filters in the Processes option's Monitor Control panel.							

- 3 Click on Enter to save the information.
- 4 Click on Exit to return to the Main Menu.

- **POWER SPC**
- *Auxiliary Schema Definition Panel*
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AUXILIARY SCHEMA DEFINITION PANEL

Perform the following steps to configure the Auxiliary Schema Definition panel:

- 1 Choose Power SPC User-Defined Cause Codes in the Configuration Manager Main Menu to display the Auxiliary Schema Definition panel.

Auxiliary Field Alias Name [Required]	Auxiliary Database Column Name [Required]	Auxiliary Database Column Data Type [Required]	Auxiliary Database Column Width

Buttons: Cancel, Enter, Exit, Next, Prev

- 2 Specify the following information for this panel:

Auxiliary Field Alias Name (Required) Alphanumeric string of between 1 to 16 characters that specifies the alias name for the database column that stores the auxiliary data being collected.

Also enter either this alias name, or the name of a tag that contains this alias name, in the Auxiliary Field Alias Name field on the Processes option's Auxiliary Collection panel. FactoryLink automatically stores the value from the tag defined in the Auxiliary Data field (from the Auxiliary Collection panel) into the database column associated with the Auxiliary Field Alias Name. SPC collects auxiliary data only for database columns defined in this panel.

Valid Entry: alphanumeric string of between 1 to 16 characters

Auxiliary Database Column Name (Required) Alphanumeric string of between 1 to 16 characters that specifies the column name in the auxiliary database where the auxiliary data will be stored. Do not use reserved keywords like FLOAT as a column name. At startup, SPC creates this database column. If you define a new column after the first time

you configure this panel, be sure to configure and run the reconciliation utility so SPC will create the new database columns. Refer to “Auxiliary Data Display Panel” on page 379 for more information.

If you change the columns in the table after the first time you configure this panel, be sure to redefine all columns you want in the updated table, even if they already exist. Otherwise, SPC deletes the data for any column not listed in this panel.

Valid Entry: alphanumeric string of between 1 to 16 characters

Auxiliary Database Column Data Type	(Required) Data type of the auxiliary database column that stores collected auxiliary data. This can be one of the following: CHAR (default) FLOAT INT SMALLINT
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Auxiliary Database Column Width	(Optional) If you entered CHAR in the Auxiliary Database Column Data Type field, type the width of the column you specified in the Auxiliary Database Column Name field. If the data type is any other than CHAR, leave this field blank.
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Valid Entry: number between 1 and 256 (default= 16)

- 3 Click on Enter to save the information.
- 4 Click on Exit to return to the Main Menu.

- **POWER SPC**
- *Auxiliary Schema Control Panel*
-
-

AUXILIARY SCHEMA CONTROL PANEL

Perform the following steps to configure the Auxiliary Schema Control panel:

- 1 Choose Power SPC User-Defined Cause Codes in the Configuration Manager Main Menu to display the Auxiliary Schema Control panel.

Historian Database Alias Name [Required]	Historian Mailbox [Required]	Aux Table Schema Update Trigger [Required]	

Buttons: Cancel, Enter, Exit, Next, Prev

- 2 Specify the following information for this panel:

Historian Database Alias Name	(Required) Alphanumeric string of between 1 to 16 characters that specifies the alias name of the database you defined in the Database Alias Name field in the Historian Information panel. Valid Entry: alphanumeric string of between 1 to 16 characters
Historian Mailbox	(Required) Name of the mailbox tag you defined in the Historian Mailbox field in the Historian Mailbox Information panel. SPC sends data to the database through this tag. Valid Entry: standard tag name Valid Data Type: mailbox
Aux Table Schema Update Trigger	(Required) Name of a tag that triggers SPC to update the columns in the database you specified in the previous two fields. Valid Entry: standard tag name Valid Data Type: digital, analog, longana, float
- 3 Click on Enter to save the information.

- 4 Click on Exit to return to the Main Menu.

- **POWER SPC**
- *Power SPC Messages*
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POWER SPC MESSAGES

Message	Number
* is an Invalid {dimn/char}, Data Ignored	7252
An attempt was made to collect data associated with a '*' dimension/characteristic name. This is a reserved name and any collections associated with '*' are rejected.	
Accept	3304
This message is displayed in the Collection Status Tag. This message indicates Power SPC has finished accepting the data, which means the data has been written to the database, and all necessary calculations have been performed. When this message is displayed, the system is ready to collect additional data. The integer value of this message is 1.	
Accept Criteria <= 0	7205
This warning message indicates the SPCDATA task has detected an invalid accept criteria for the acceptance sampling configuration. The Accept Criteria must be 1 or more units which pass the test. Correct the entry in the Sample Plan panel or the default value of the tag/constant in the SPC Process.	
Accept Criteria > Sample Size	7206
This warning message indicates the SPCDATA task has detected an invalid accept criteria for the acceptance sampling configuration. The Accept Criteria must be less than or equal to the Sample Size. Correct the entry in the Sample Plan panel or the default value of the tag/constant in the SPC Process.	
Activating {process name} Process...	3202
After the configuration of the SPC Process is tested and validated, the SPCDATA task will inform you the process is starting.	

Actual sample size differs from the configured sample size

7264

This warning message is displayed when FIXED acceptance sampling is enabled, but a sample is closed (Sample Close Trigger) with a number of outstanding samples different from the configured Sample Size.

Ad Hoc

13017

The term “Ad Hoc” or it’s equivalent translation into another language. This word can be displayed within other messages that convey the state or configuration of a Power SPC Chart.

Ad Hoc Operation Requires A Sample Plan

7563

This warning message indicates you are trying to use a chart in AdHoc mode without a sample plan. A sample plan must be configured, either as a constant in the Sample Plan panel field, or as a tag with a valid named specified.

As Monitored

13018

The term “As Monitored” or it’s equivalent translation into another language. This word can be displayed within other messages that convey the state or configuration of a Power SPC Chart. Alternative term: “Actual”.

AUX Field {field name} Definition Mismatch on Size or Type

7109

This warning message indicates a field in the existing auxiliary data tables does not match its schema definition within the User Defined Auxiliary Information panels. Refer to error 7106 for corrective actions.

AUX Field {field name} does not exist

7108

This warning message indicates the given field does not exist within the existing auxiliary data tables, although it is defined within the User Defined Auxiliary Information panels. Refer to error 7106 for corrective actions.

- **POWER SPC**
- *Power SPC Messages*
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AUX Field {field name} Not Configured 7110

This warning message indicates an attempt to collect an auxiliary field whose definition is missing from the User Defined Auxiliary Information panels or whose presence is missing from the existing auxiliary data tables. Refer to error 7106 for corrective actions.

Both 13016

The word “Both” or it’s equivalent translation into another language. This word can be displayed within other messages that convey information about the filter applied during Run Rule evaluation. This word can be input or displayed when dealing with the value of the Filter Tag from the Monitor Control panels for the Power SPC Process or Power SPC Chart configuration.

Calculation 13004

The word “Calculation” or it’s equivalent translation into another language. This word will be displayed in all messages that convey an activity has taken place relating to an SPC calculation (e.g. XBARR Calculation has been performed).

{calculation}{dimn/char} Calculation Performed 3351

This informational message is displayed in the Process Message Tag to inform you an SPC calculation has been performed. If several calculations are configured and performed at the same time, these messages can scroll through the message tag very quickly.

{calculation}{dimn/char} Limits Recalculated 3352

This informational message is displayed in the Process Message Tag to inform you the control limits have been recalculated

{calc}{dimn/char} Limits Not Recalculated 7308

This message indicates Control Limits were not recalculated for the requested calculation and dimension/characteristic name. This could be caused by a missing control limit factor or lack of data values needed to perform the control limit calculation.

Check for prior warnings which may provide a reason for the failure to calculate control limits. To have warnings logged to the log file, use -15 as a program argument for the Power SPC tasks.

{calc}{dimn/char} Violated {rule} Run Rule 3380

This informational message is displayed in the Process Message Tag to inform you Power SPC has determined the latest calculated value for the named calculation has caused a violation of the named run rule. (This is NOT the only method of notification of a run rule violation.)

Calc Type with Invalid Size 7212

This warning message indicates the Power SPC task has detected an invalid value for Calc Size. This value indicates how many data values will make up a subgroup. The calculation will be performed on a subgroup. This size, obtained from the Subgroup Size, but overridden by the Calc Size field, is explained in the SPC user documentation.

Cannot Activate Process (process name); Duplicate Location (loc name) Subgroup (subgroup name) 5205

Rejected an attempt to activate a process which has a combination of location and subgroup name currently being sampled by another active process. Each active process must have a unique combination of location and subgroup name.

Cannot Determine Type of Data Collected 7254

This warning message indicates the SPCDATA task is unable to determine the data values are dimensional or characteristic. Examine the configuration in the Dimn or Char Type field in the Data Collection Control panel and make sure it correctly specifies DIMENSION or CHARACTERISTIC.

- **POWER SPC**
- *Power SPC Messages*
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Cannot find table entry within CT: {CT file id} 5401

This error message indicates the Power SPC task received an error when reading the CT file. This message indicates an expected entry was not found. Since this is an error, it must have been required information.

Cannot Suspend Changes for an As-Monitored Chart 7543

This warning message indicates the SPCGRAPH task has detected a change to the Suspend Changes Tag while the corresponding chart is in As Monitored mode. Suspend Changes means you are planning on making several changes to the calculation control tags at one time. Since As Monitored mode is showing exactly what SPCDATA was doing, changes to the charts calculation control tags are not allowed in that mode, and thus the change to Suspend Changes Tag is invalid as well.

Can't Disconnect from {db alias} Database 7127

This warning message indicates the Power SPC task encountered a problem disconnecting from the database. An error message with details from the historian is appended to this warning.

Can't Open Chart Cfg 1005

This informational message is displayed in the SPCGRAPH Task Message Tag to inform you an error occurred while accessing the configuration information for the Power SPC Charts. The file containing the configuration tables for SPC processes (SPCGRAPH.CT) could not be opened. Verify configuration information exists for the domain in which the task is executing (probably USER). Force the regeneration of this CT and try again. More information may be available in the log file.

Can't Open Process Cfg 1004

This informational message is displayed in the SPCDATA Task Message Tag to inform you an error occurred while accessing the configuration information for the SPC Processes. The file containing the configuration tables for SPC processes (SPCAPP.CT) could not be opened. Verify configuration information exists for the domain in which the task is executing (probably SHARED). Force the regeneration of this CT and try again. More information may be available in the log file.

Can't Read from {tag name} Tag 7126

This warning message indicates the Power SPC task encountered a problem reading from the named tag.

Can't Write to {tag name} Tag 7125

This warning message indicates the Power SPC task encountered a problem writing to the named tag.

Cause Codes & Comments not Available in AdHoc 7501

This warning message indicates the SPCGRAPH task has detected a change to the Cause Code, Cause Class, or Comment tags while in AdHoc mode. Changes to these tags are only allowed in As Monitored mode. Changes are prevented in Ad Hoc mode because it is an invalid premise to make a semi-permanent change or comment to data based on a picture that may not represent the data as it was actually collected, calculated, and monitored in real time. Switch to As Monitored mode before changing these tags.

Cause Code {code} or Class {class} Not Configured 7505

This warning message indicates the SPCGRAPH task has been unable to validate the cause code and cause class you are trying to assign to the point on the control chart. Check that its combination of cause code and class is defined in either the User Defined Cause Code table in FLCM or the External Cause Code Table (CAUSE CODE table) in your SPC database. The cause code and class must be defined prior to their assignment to a point.

Changes Restricted by Sample Plan: {plan name} 7182

This warning message indicates the Power SPC task has rejected a change to the value of one of the control tags. If this message is displayed, it means the sample plan has a YES value for "Restrict Changes," which means changes to the parameters of the plan are not allowed.

- **POWER SPC**
- *Power SPC Messages*
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Changes Restricted While Active 7181

This warning message indicates the Power SPC task has rejected a change to the value of one of the control tags. While an SPC Process is active, changes to certain tags are not allowed. Disable your process first, then change the value. Refer to the *PowerSPC Configuration Guide* for information on which tags require disabling the process.

Characteristic 13006

The word “Characteristic” or its equivalent translation into another language. This word can be displayed within other messages or can be displayed or input in the Dimension or Characteristic Type tag.

Chart 13009

The word “Chart” or its equivalent translation into another language. This word can be displayed within other messages that convey a problem with the configuration.

Chart Scroll Frequency != 1 for {object} 7143

This warning message indicates in the given chart’s object animation, the Chart Scroll Frequency field is set to a value other than 1. A value of 1 is required by Power SPC.

Chart Being Set for {Ad Hoc/As Mon} Mode 3408

This informational message is displayed in the Chart Message Tag to inform you the chart is in progress of switching modes. Since this requires the data be recalled from the database, this may take a few seconds.

Chart Cleared 3402

This informational message is displayed in the Chart Message Tag to inform you Power SPC has cleared the chart of data.

CL Size Differs for Calc {name} (Actual {}, Specified {}) **7322**

This warning message indicates the number of calculated values included in the control limit calculation does not equal the configured amount. When the number of calculated values to include exceeds the number of calculations performed, this warning results.

Completed Reconciliation of SPC Auxiliary Data Tables **3154**

This message will be displayed in the Power SPC Process Message Tag. It indicates the Aux DB schema has been successfully updated to match the schema declared within the Auxiliary Schema Definition panel.

Connecting to Database {database alias name} **3151**

This message will be displayed in the Power SPC Process or Chart Message Tag. This message indicates Power SPC is attempting to connect to the configured Historian database.

Connected to Database {database alias name} **3152**

This message will be displayed in the Power SPC Process or Chart Message Tag. This message indicates Power SPC has successfully connected to the configured Historian database.

{Count} Invalid # Entries in Accept Sampling Panel **7203**

This warning message indicates the Power SPC task has detected more than one entry in the acceptance sampling panel for the SPC process. Despite the panel allowing multiple entries, the SPCDATA task only allows one entry row of information in that panel. The other information is ignored, but this message is sent as a reminder of unused configuration data.

- **POWER SPC**
- *Power SPC Messages*
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{Count} Value(s) Collected for {name}; Accept Quantity {qty}7260

This warning message indicates the SPCDATA task has detected a mismatch between the number of values collected for a named dimension or characteristic, and the quantity accepted value. This message details the values involved. The data will still be accepted, but you should note calculations using this data may have unintended results because the grouping of collected data into subgroup (calculation) is based on the sum of accept quantity value, and not the actual count of the collections.

CT File for {CT filename} Missing 5003

This error message indicates the named CT file is missing. The CT files should be generated automatically. If you cannot find the CT file in its proper place (Refer to Error 5002), be sure the {CT filename} is included in your CTLIST file. The CTLIST file is found in your {FLINK}/CTGEN directory. That file must list all of the Cts that must be generated. If the Power SPC tables are missing, install the CTLIST file that came with your Power SPC task. If the named file is included in the CTLIST file and the CT is still not generated properly, try generating the file manually with the command CTGEN -i {CT filename}. If any errors occur, it is possible the CDB files in your FLAPP directory are corrupted. Either FLREST your saved application, or delete the CDB files for that CT and re-enter the configuration information. The CDB files to delete are listed next to the {CT filename} in the CTLIST file.

CT File for {process,plan,chart} Not Closed 7130

This warning message indicates the Power SPC task encountered a problem closing a CT file. Although this problem should not happen, investigate if it happens repeatedly. A setting for your operating system may need adjustment. However, since Power SPC can continue, this message is only a warning.

CT Record Size for {CT filename} Invalid 5001

This error message indicates the size of the record in the CT file (Configuration Table) does not match the internal record size for the Power SPC task. Proper installation will insure the CTG matches the task. This problem should be fixed by making sure the named .CTG file matches the release of the Power SPC task.

CT {CT Record} Size of {size} != {size} 5004

This error message indicates the size of the CT record does not match the internal record size for the Power SPC task. Proper installation will insure the CTG matches the task. The sizes listed in the message are CT record size and the internal record size, respectively. This problem should be fixed by making sure the named .CTG file matches the release of the Power SPC task. These sizes, and the corresponding .CTG file would be helpful information if it becomes necessary to call FactoryLink Customer Support.

Database management disabled - process {name} Active 5333

This error message indicates auxiliary table reconciliation and SPC-to-Power SPC database conversion can only be invoked when all processes are disabled.

Data Displayed For {chart}{dimn/char} 3407

This informational message is displayed in the Chart Message Tag to inform you the chart has been altered so the newest point on the chart correlates to the specified date and time. This message is typically displayed after changing the value of the Newest Date/Time Input Tag.

- **POWER SPC**
- *Power SPC Messages*
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DB Clearing Failure: Table {table}: {historian message}	9011
DB Closure Failure: Table {table}: {historian message}	9007
DB Cursor Creation Failure: Table {table}: {historian message}	9002
DB Describe Failure: Table {table}: {historian message}	9006
DB Execution Failure: Table {table}: (historian message)	9010
DB Fetch Failure: Table {table}: {historian message}	9005
DB Insert Failure: Table {table}: {historian message}	9003
DB Prepare Failure: Table {table}: {historian message}	9004
DB Update Failure: Table {table}: {historian message}	9001
DB Deletion Failure: Table {table}: (historian message)	9012

Whenever a transaction sent to the historian task returns a failure, one of the above messages is displayed. This message conveys the type of operation being performed along with any error/informational messages passed back by the historian task. For more information on the historian messages, consult the appropriate historian task chapter and/or the error code documentation provided along with your database management system (i.e., Oracle).

**{Defective count} Defectives > {accept qty}
Qty Accepted**

7257

This warning message indicates the SPCDATA task has detected the number of defectives collected exceeds the number of units accepted (i.e., there were 7 defective units, but values were accepted for only 5 units). This would happen most often when you forget a unit can have multiple defects but can only be considered defective for one of the characteristics.

**{Defective count} Defectives > {defect count}
Defects for {char}**

7258

This warning message indicates the SPCDATA task has detected the number of defectives collected exceeds the number of defects collected (i.e., there were 7 defective units but only 4 defects). This would happen most often when collecting both defective count and defect count, and you forget a unit which is defective because of the presence of a defect must have at least one defect collected for the same characteristic.

Dimension

13005

The word "Dimension" or it's equivalent translation into another language. This word can be displayed within other messages, or can be displayed or input in the Dimension or Characteristic Type tag.

**{Dimn/char} names required for collection,
Data Ignored**

7253

An attempt was made to collect data associated with an unspecified (empty string) dimension/characteristic name. This is invalid and any associated collections are rejected.

**Disconnected from Database
{database alias name}**

3153

This message will be displayed in the Power SPC Process or Chart Message Tag. This message indicates Power SPC has disconnected from the configured Historian database.

- **POWER SPC**
- *Power SPC Messages*
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Edit Session Not Open

7504

This warning is displayed when the edit mode tag has been set of OFF or 0, but the chart was not in edit mode to begin with. In order to edit data values, you must first open an edit session (turn ON edit mode) by setting the edit mode tag to 1. Check your edit mode tag in the Control Chart panel. Remember, when you have finished editing, turn off edit mode to write the edited values to the database.

Either

13015

The word “Either” or its equivalent translation into another language. This word can be displayed within other messages that convey information about the filter applied during Run Rule evaluation. This word can be input or displayed when dealing with the value of the Filter Tag from the Monitor Control panels for the Power SPC Process or Power SPC Chart configuration.

ENTER Calc Suspend Changes Mode

3353

This informational message is displayed in the Chart Message Tag to inform you the Suspend Changes Tag has been turned ON and you are IN the mode where changes made to the calc tags will not take effect until you exit Suspend Changes mode.

Error

3003

This message will be displayed in the TASK message, which is animated on the RUNMGR screen to indicate the Power SPC task has encountered an error during the initialization stage. A more detailed message should be displayed in the Power SPC Process or Chart Message Tag.

Error

3306

This message is displayed in the Collection Status Tag. This message indicates an error has occurred accepting the data into the database. When this message is displayed, the system may not have saved the data to the database. The integer value of this message is -1.

Error Closing CT file: {ct file name} 5404

This error message indicates the Power SPC task received an error when closing the CT file. This error should not occur, and if it does, other CT or file related problems will probably occur, so we shut down the process or chart. If you have entered information in the panels, be sure the CT file has been regenerated since the time you updated the panels. You may try deleting the CT file, and it will regenerate during the FLRUN.

Error ({error number}): No Textual Translation Available 3621

This informational message is displayed in the Task Message Tag or Process Message Tag to inform you no valid message was found in the message file for the particular condition encountered.

Error Fetching Open Sample data: {errmsg} 7251

This warning message indicates the SPCDATA task has failed to get data that applies towards the current acceptance sampling lot. An error message from the historian is appended to the warning message.

Error occurred detaching from the kernel 7001

This warning message indicates the Power SPC task did not clearly detach from the kernel. Problems may occur when you attempt to restart the Power SPC task.

Error occurred reading CT 5403

This error message indicates the Power SPC task received an error when reading the CT file. It indicates an error occurred reading the records from the CT. If you have entered information in the panels, be sure the CT file has been regenerated since the time you updated the panels. You may try deleting the CT file, and it will regenerate during the FLRUN.

Error opening {FLAPP}\ct\object.ct 5450

This error message indicates an indirect reference to a tag cannot be resolved. This is a feature under development that has yet to be enabled. This message should not be displayed.

- **POWER SPC**
- *Power SPC Messages*
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Error Opening Chart Animation Cfg for {object} 7141

This warning message indicates the Power SPC task encountered a problem opening the chart configuration information specified in the Application Editor. Execute utility SPCTRFIX to generate the SPCGINFO.CT.

Error Reading Cfg for Auxiliary Field 7105

This warning message indicates the Power SPC task encountered a problem reading the configuration for a user-defined auxiliary field. Verify and correct the contents of the user-defined auxiliary panels, or regenerate the SPCUDAUX.CT file.

Error Reading Cfg for Database Manager {Reason} 5332

This warning message indicates the Power SPC task has encountered a problem reading the configuration information for the Database Manager panel. This information is only used during the conversion process, so it will not affect operation of the Power SPC tasks. SPCDBMGR.CT should be regenerated, and the entries in the corresponding panels should be checked.

Error Reading Cfg for Plan {plan name}: {cfg area} 7103

This warning message indicates the Power SPC task encountered a problem reading the configuration for the named plan. The problem area of the configuration is also named in the message. Correct the contents of the indicated panel, or regenerate the SPCPLAN.CT file.

Error Reading Cfg for Run Rule {rule}: {cfg area} 7104

This warning message indicates the Power SPC task encountered a problem reading the configuration for the named user-defined run rule. The problem area of the configuration is also named in the message. Correct the contents of the indicated panel, or regenerate the SPCUDRR.CT file.

**Error Validating Auxiliary Field Cfg
Information**

7106

This warning message indicates the schema of the existing auxiliary data tables does not match the schema defined in the User Defined Auxiliary Information panels. You may need to correct this difference by triggering the Aux Table Schema Update Trigger configured in the User Defined Auxiliary panels.

Error writing to task status tag

7002

This warning message indicates the status tag for the Power SPC Task could not be updated. While your system is still operational, you may want to check the task's configuration in the system configuration table.

EXIT Calc Suspend Changes Mode

3354

This informational message is displayed in the Chart Message Tag to inform you the Suspend Changes Tag has been turned OFF, and you have exited the mode where changes made to the calc tags will not take effect immediately.

Fa

3302

This message is displayed in the Acceptance Sampling Pass/Fail Status tag. This is the negative response to indicate the sample has "failed" the acceptance test.

**Failed Loading User Defined Auxiliary
Field Cfg**

5321

This error message indicates the Power SPC Task reporting this message was unable to successfully load the information from the User Defined Auxiliary Fields panels. Refer to the Auxiliary Field Schema Definition panel. Since this is a high level error message, there may be additional information in other messages which would be in the log file. The problem may be only one field in the panel.

- **POWER SPC**
- *Power SPC Messages*
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Failed Loading DataBase Manager Field Cfg

5331

This error message indicates the Power SPC task reporting this message was unable to successfully load the information from the Database Manager panels. This CT file or .CDB files may be corrupt or missing. Since this is a high level error message, there may be additional information in other messages which would be in the log file. The problem may be only one field in the panel.

Failed to Add Trigger {trigger tag}

7191

This warning message indicates the Power SPC task has failed to add/register a trigger tag. Normally, this problem results from a lack of RAM. Check the log file for further information and call Customer Support.

Failed to Allocate Memory for {internal structure}

7129

This warning message indicates the Power SPC task encountered a problem allocating memory for the named internal structure. This message will normally be followed by an “Out of RAM” message. Although this information may help identify the exact location of when the problem occurred, the problem is your system does not have enough memory to run your configuration, or is not freeing up memory resources.

Failed to Evaluate Run Rule {name}: {reason}

7405

This warning message indicates the Power SPC task failed to perform the evaluation of the named run rule for the reason stated in the second part of the message.

Failed to Get Process {process name} Cfg

5201

This error message indicates the SPCDATA was unable to read the configuration for the named process. This would likely occur if the SPCAPP.CT file is missing or corrupted.

Failed to Load Process Cfg for {process name} 5203

This error message indicates the SPCDATA was unable to successfully load the SPC Process configuration information for the named process. This would likely occur if the SPCAPP.CT file is missing or corrupted. This is a higher level message, and perhaps another message may give a better idea of the problem. (Refer to the log file.)

Failed to Read from {CT filename} CT 5002

This error message indicates Power SPC could not read from the named CT file. Either the CT file was not generated properly (during FLRUN) or there was a problem reading from the file. Verify the tables existence and size by displaying the directory information for the named file in its appropriate CT directory under your FLAPP directory. SPC Process tables are in the SHARED domain, SPC Chart tables are in the USER domain. The remaining tables are domainless tables and should be in the {FLAPP}/CT directory.

Failed to Read Process Cfg for {Process name} 5204

This error message indicates the SPCDATA was unable to successfully load the SPC Process configuration information for the named process, and the process could not be loaded nor activated. This would likely occur if the SPCAPP.CT file is missing or corrupted. This is the highest level error message for this type of problem. It is very likely another message may give a better idea of the problem (Refer to the log file).

Fetching Data for {chart} {dimn/char} Chart... 3211

After a chart's SPC configuration information is loaded and a connection is established to the database, data is fetched from the database to prepare the currently opened subgroups with previously collected data not part of a complete subgroup. This message may be displayed several times before the chart is displayed, because the SPCGRAPH task fetches data for all configured calculations in the loaded sample plan. This is to enable you to quickly switch between chart types without fetching new data from the database.

Graph {chart} for {dimn/char} Displayed 3401

This informational message is displayed in the Chart Message Tag to inform you Power SPC has calculated and displayed a chart.

- **POWER SPC**
- *Power SPC Messages*
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Historical Cause Code No Longer Configured

7311

This warning message indicates the SPCGRAPH task has determined the cause code assigned to the point is no longer part of the configuration. This is only a warning because it may be intentional, but it warns you the cause code is no longer in the User Defined Cause Code panel nor in the External Cause Code Table.

Historical Cause Class No Longer Configured

7312

This warning message indicates the SPCGRAPH task has determined the cause class for the cause assigned to the point is no longer part of the configuration. This is only a warning because it may be intentional, but it warns you the cause code assigned is no longer configured as belonging to the cause class. Refer to the User Defined Cause Code panel or the External Cause Code Table.

Histogram Max < Histogram Min

7149

This warning message indicates the Power SPC task has detected the Histogram Maximum value is less than the Histogram Minimum value. Verify and/or correct the values in the Power SPC Bar Chart Display panel.

Illegal re-definition. Calculation already exists

7307

An edit of the calculation type and/or dimension/characteristic name would result in a calculation that duplicates one currently being performed by the process. This is illegal and the new values are rejected.

Invalid Accept Criteria

7261

This warning message indicates an attempt to set the process Accept Criteria to something invalid. The accept criteria must be less than or equal to the sample size and greater than 0.

Invalid Arg to Function: {argument} 5007

This error message indicates an internal error has been detected. Please report this message to FactoryLink Customer Support along with the release levels of both FactoryLink and Power SPC.

Invalid EWMA Constant 7210

This warning message indicates the Power SPC task has detected an invalid Calculation Constant for the EWMA calculation. The Calculation Constant field will be used for the lambda value in the EWMA formula.

Invalid Calculation Constant 7342

This warning message indicates an invalid calculation constant is specified in the tag or the configuration panel. Depending on the Calculation Type, certain ranges of values are expected. These are detailed in Chapter 5, “Creating a Power SPC Sample Plan,” in the *PowerSPC Configuration Guide*.

Invalid Calculation Size 7341

This warning message indicates an invalid calculation size is specified in the tag or the configuration panel.

Invalid Cfg for Chart {object}: {bad cfg} 5301

This error message indicates configuration information for the named chart contained something was determined to be invalid. This would likely occur if the SPCGRAPH.CT file is corrupt or one of the panels contains an invalid field entry. If the configuration information is causing the problem, there will likely be another message indicating the invalid field. This is the highest level message, so there may be other messages (refer to the log file) that indicate the exact problem.

{Invalid Chart Type} Unknown Graph 7522

This warning message indicates an invalid entry was made into the Chart Type Tag. The Chart reverts to its previously valid chart type after this message is displayed.

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Invalid Definition for Auxiliary Field {field} (sts={error}) 7107

This warning message indicates the given field has an invalid definition in the User Defined Auxiliary Information panels. If the sts value is (-2), then the field name conflicts with that of a reserved field name. If the sts value is (-3), then the field name has been defined multiple times within the panel.

Invalid entry for acceptance sampling enabling 7265

This warning message is displayed when an invalid entry is placed into the Acceptance Sampling Tag. Valid entries are (NONE, FIXED, and VARIABLE) or their numeric complements (0, 1, and 2).

Invalid Lot Size 7262

This warning message indicates an attempt to set the process Lot Size to something invalid. It must be greater than 0.

Invalid Number of Points Specified ({# points}) 3404

This informational message is displayed in the Chart Message Tag to inform you an invalid number of points was entered into the Number Of Points Tag. In this case, the chart is left as is, and the request is ignored.

Invalid Number of Points for CL Calc 7343

This warning message indicates an invalid number of points was detected for the Control Limit Calculation.

Invalid Process Cfg for {process name} {Reason} 5202

This error message indicates configuration information for the named process contained something determined to be invalid. This would likely occur if the SPCAPP.CT file is corrupt or one of the panels contains an invalid field entry. If the configuration information is causing the problem, there will likely be another message indicating the invalid field.

Invalid Qty {value} Accepted, Data Ignored 7256

An attempt to accept data (accept trigger set to one) when the accept quantity is less than or equal to zero. Any data collected towards this acceptance is released and must be reentered.

Invalid Run Rule Filter 7406

This warning message indicates the Power SPC task detected an invalid value for the filter setting on a run rule. The rule could not be evaluated.

Invalid Sample Size 7263

This warning message indicates an attempt to set the process Sample Size to something invalid. It must be greater than 0.

**Invalid {type} Trend Run Rule;
Vio-pnts != Inv-pnts 7407**

This warning message indicates the Power SPC task detected an invalid configuration for a Trend run rule. This message means only “consecutive” trends are supported. In other words, the number of points to investigate must equal the number of points to violate. This message is displayed if “successive” trends are not yet supported.

LCL > UCL 7208

This warning message indicates the Power SPC task has detected invalid control limit specifications. The Lower Control Limit must be less than or equal to the Upper Control Limit. Correct the entry in the Sample Plan panel or the default value of the tag/constant in the SPC Process.

Limits Will Be Recalcd When Suspend is Toggled OFF 7546

This warning message indicates the SPCGRAPH task has detected a change to a Control Limit Trigger Tag, but is unable to perform this calculation because the Suspend Change Tag is currently set to ON. This change will be queued up until the Suspend Changes Tag is toggled back to OFF, at which time all queued operations will be performed.

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Loading {process name} Process Configuration 3203

Both at task startup, and also when the SPC process is enabled, (either automatically at task startup, or by toggling its disable tag to OFF), the SPCDATA task will inform you the configuration information for the process is being loaded.

Loading {sample plan name} Sample Plan 3204

When the SPC process configuration information has been loaded, the SPCDATA task will load the configured Sample Plan. This message informs you the Sample Plan configuration information is being loaded.

Location 13010

The word “Location” or its equivalent translation into another language. This word can be displayed within other messages that convey a problem with the configuration. Its intended purpose is to differentiate identical processes running in different locations, whether different machines or different cities. The database maintains the value of the Location along with the raw data value and subgroup name.

Lower 13014

The word “Lower” or its equivalent translation into another language. This word can be displayed within other messages that convey information about the filter applied during Run Rule evaluation. This word can be input or displayed when dealing with the value of the Filter Tag from the Monitor Control panels for the Power SPC Process or Power SPC Chart configuration.

LSL > USL 7207

This warning message indicates the Power SPC task has detected invalid dimensional specifications. The Lower Spec Limit must be less than or equal to the Upper Spec Limit. Correct the entry in the Sample Plan panel or the default value of the tag/constant in the SPC Process.

Mailbox error ({error id}) fl_count_mbx() 5421

An error was encountered when performing the given mailbox operation with the kernel. The error the kernel encountered is reported via code error id.

Mailbox error ({error id}) fl_query_mbx() 5422

An error was encountered when performing the given mailbox operation with the kernel. The error the kernel encountered is reported via code error id.

Mailbox error ({error id}) fl_read_mbx() 5424

An error was encountered when performing the given mailbox operation with the kernel. The error the kernel encountered is reported via code error id.

Mailbox error ({error id}) fl_write_mbx() 5425

An error was encountered when performing the given mailbox operation with the kernel. The error the kernel encountered is reported via code error id.

Math Failure ({calc name} {char/dimn name}): {math error} 7305

A problem was encountered while performing the given calculation for the given dimension or characteristic. The math errors are:

Internal math error - generate log file and contact customer support.

Subgroup contains no samples - given subgroup contains no raw data collections.

Subgroup contains only one sample - given subgroup contains no raw data collections, but the calculation type requires at least two.

Subgroup quantity deviates \geq %d percent from calc size - for some calculation types (i.e.,P), excessive deviation of subgroup size can invalidate control limit calculations. This is a warning of such a situation.

Cannot compute value with sigma of 0 - Calculations, such as Cp, cannot be calculated if the data set has a sigma of zero.

Multiple samples in subgroup - using average - If a single transaction contains multiple collections of a dimension, an individual calculation is unable to break the transaction into multiple, individual calculation. Therefore, a single individual calculation is performed on the average of all said dimensions within the transaction.

Cannot compute value with RMS of 0 - Calculations, such as skewness, cannot be calculated if the data set has a RMS of zero.

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Memory Alloc: {internal structure} 5008

This error message indicates Power SPC was unable to allocate a necessary memory buffer, and is unable to continue. This is a fatal error. Although it is likely your computer system requires more memory to successfully execute the combination of tasks you have configured, it is possible the system memory resources are not being freed properly by either one or more programs or the operating system. Often times, stopping other programs or rebooting your system will free up additional memory. If this problem continually reproduces itself, and you are sure you have enough memory, it is likely more technical memory resource analysis is required to find the cause of the problem.

Missing Dimension or Characteristic Name Tag 5227

This error message indicates the SPCDATA has failed to find a valid FactoryLink tag defined for the Dimension or Characteristic Name Tag for the process. This message is displayed in the Process Message Tag or log file. Although the field may be configured with a constant or a tag, SPCDATA is trying to interpret your entry as a tag. Verify and correct this configuration field in the Collection Control panel for SPC Processes. If you are configuring a constant string value, be sure it starts with a single tic or single quote mark.

Missing Dimension or Characteristic Tag 5228

This error message indicates the SPCDATA has failed to find a valid FactoryLink tag defined for the Dimension or Characteristic Type tag for the process. This message is displayed in the Process Message Tag or log file. Although the field may be configured with a constant or a tag, SPCDATA is trying to interpret your entry as a tag. Verify and correct this configuration field in the Collection Control panel for SPC Processes. If you are configuring a constant string value, be sure it starts with a single tic or single quote mark.

Missing Global Tag: {Global Tag} 1006

Required global tag missing from application's configuration. Execute FLCONV on the application in order for any other missing tags to be added.

New {dimns/chars} Restricted: Ignored {name} **7255**

This warning message indicates an attempt to collect a new dimension and characteristics name was made and rejected due to the process being configured to reject undefined or new dimension and characteristics. This message names the rejected data.

Newest Time < Oldest Time **7147**

This warning message indicates for the chart's Oldest Time and Newest Time tag values, the Newest Time is earlier in time than the Oldest Time. This is invalid for all SPC charts. These tags are configured in the Chart Definition panel.

No **13002**

The word "No" or its equivalent translation into another language. Many tags can be set to a YES or NO value, and this is the text to display or match for a negative value.

No Acceptance Sampling Control Tags for Process {process} **3215**

Warning issued when a sample plan specifying acceptance sampling is loaded into a process that lacks acceptance sampling tags.

No Accept Quantity Tag Configured **5223**

This error message indicates the SPCDATA has failed to validate the Accept Quantity from your Process Definition panel. This tag is required in FLCM, so this error is not likely to occur unless a tag is improperly defined. Validate the entry in that field. It can be a constant value (i.e., 1), or a tag.

No Accept Trigger Configured **5222**

This error message indicates the SPCDATA has failed to validate the Accept Trigger. This trigger is required in FLCM, so this error is not likely to occur unless the tag is improperly defined. Validate the tag was properly configured in the Process Definition panel for the process. If the panel entry is displayed as valid, try to FLSAVE and FLREST your application.

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No Calculations Cfg for Process 7301

This warning message indicates the current process is not performing any calculations. It is issued for this condition when attempting to scroll calculations through a tag set configured in the Calculation Control panel.

No Calculation Selected 7306

An attempt to edit the parameters of a calculation via a tag set currently not attached to a calculation has been rejected.

No {Chart Type} Graphs Cfg for Chart 7523

This warning message indicates the SPCGRAPH task has detected a valid chart type change in the Chart Type Tag, but is unable to display it because it is not an active calculation. The list of calculations available to perform are generated from the sample plan.

No Collection Tags Configured 5225

This error message indicates the SPCDATA has failed to find a valid set of Collection Tags for the process. You must define at least one data collection tag. Since you may define any of three collection tags, it is possible no valid tags were defined. Refer to the Collection Control panel for SPC Processes.

No Configuration Information for {chart name} 3212

During the initial startup phase, the SPCGRAPH task will first load and test the chart configuration information from the Chart Definition panel. If there are no charts configured, this message will be displayed and the task will shutdown. Configure the Chart Definition panel in FLCM.

No Configuration Records Found 5006

This error message indicates the Power SPC task was unable to read any records from the CT. Either the CT file was not properly generated, or no records existed in the table. Configure some information in that required panel, regenerate the CT, or FLREST your application.

No Configuration Records in {panel} for {chart}

3213

When processing the initial open message for a chart, the entire configuration from the SPC Charts panels is loaded for that chart. In the case where no entries were made in one of the optional panels for the chart, this message is displayed in the Chart Message Tag to inform you SPCGRAPH did not detect any information for the named panel.

No Data

3305

This message is displayed in the Collection Status Tag. This message indicates no data exists in the collection buffer. When this message is displayed, the system is ready to collect data. The integer value of this message is 0.

No {factor name} CL Factor For Subgroup Size {size}

7321

Default control limit factors are provided by Power SPC for subgroup sizes up to 25. Any modifications or additions to these factors may be entered in the Power SPC Control Limit Calculation Factors panels of the Configuration Manager.

No Graphics Animation Information for {chart}

3214

When processing the initial open message for a chart, the animation for that chart is loaded. This information is located in a special CT file named SPCGINFO.CT. This file must exist in the proper domain (same as SPCGRAPH; therefore the USER domain). This file is generated automatically during the FLRUN. If the file is not created automatically, a utility program called SPCTRFIX can be executed to create this file. This file contains information about the chart object and the tags you configured in the Chart animation panel in the Application Editor (such as the Cursor Position Tag, and the Start and End Time tags). Without this information, Power SPC can NOT draw an SPC Chart.

No Graphs Cfg for Chart

7521

This warning message indicates the SPCGRAPH task has been unable to scroll the display to the next calculation in the sample plan because either the chart is not currently associated with a sample plan or the associated plan defines no calculations.

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No header records found in CT

5402

This error message indicates the Power SPC task received an error when reading the CT file. The information is normally stored in CT records associated with a CT header which serves as a record locator. More specifically, this message indicates there are no headers in the CT. If you have entered information in the panels, be sure the CT file has been regenerated since the time you updated the panels. You may try deleting the CT file, and either regenerate it yourself, or let it regenerate during the FLRUN.

No {name} Calcs Cfg

7303

This warning message indicates the SPCDATA task has not found any calculations of the named type configured. This message would be displayed because you have entered a new calculation in the Calculation Name tag and the Power SPC task is not performing that calculation. When you enter a new calculation in that tag, Power SPC will look through its internal list of calculations (generated from the sample plan) and show you the first of those calculations that match the type you have asked for in the tag. When no match is found, this message is displayed and the calculation name tag is returned to its original value.

None

13003

The word “None” or its equivalent translation into another language. This word may be displayed in messages that indicate the state of an activity is disabled or inactive, such as Acceptance Sampling.

Normal Shutdown

3004

This message will be displayed in the TASK message, which is animated on the RUNMGR screen to indicate the Power SPC task has successfully completed its shutdown tasks such as disconnecting from the database. After this message is displayed, the task is ready to be restarted.

No Run Rules Cfg for Calc

7401

An attempt to edit the parameters of a run rule via a tag set currently not attached to a run rule loaded from the sample plan has been rejected.

No SPC Location Tag Configured

5230

This error message indicates the Power SPC task has failed to find a valid FactoryLink message tag defined for the Location Tag. This message is displayed in the Process or Chart Message Tag and log file. Although the field may be configured with a constant or a tag, SPCDATA is trying to interpret your entry as a tag. Verify and correct this configuration field in the Collection Control panel for SPC Processes. If you are configuring a constant string value, be sure it starts with a single tic or single quote mark.

No SPC Processes Configured

3201

During the initial startup phase, the SPCDATA task will first load and test the process configuration information from the Process Definition panel. If there are no processes configured, this message will be displayed and the task will shutdown. Configure the Process Definition panel in FLCM.

No Subgroup Name Tag Configured

5232

This error message indicates the Power SPC Task has failed to find a valid FactoryLink message tag defined for the Status Message Tag. This message is displayed in the Process or Chart Message Tag and log file. Although the field may be configured with a constant or a tag, the Power SPC task is trying to interpret your entry as a tag. Verify and correct this configuration field in the Process Definition or Chart Definition panels. If you are configuring a constant string value, be sure it starts with a single tic or single quote mark.

No {type} Rules Cfg for {calc}-{dimn/char}

7402

This warning message indicates the SPCDATA task has not found any run rules of the named type configured. This message is displayed because you have entered a new run rule in the Run Rule Name tag, and the Power SPC task is not performing that monitoring. When you enter a new run rule in that tag, Power SPC will look through its internal list of run rules (generated from the sample plan) and show you the run rule that matches the type you have asked for in the tag. When no match is found, this message is displayed and the run rule name tag is returned to its original value.

No user-defined fields configured for table: {name}

5444

This error message indicates the creation of the user-defined aux table was aborted due to no schema having been configured.

- **POWER SPC**
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Number of CL Points < 0 for Calc {calc name} 7211

This warning message indicates the Power SPC task has detected an invalid value for the Number of CL Points for the named calculation. This value indicates how many points of data should be used to calculate the control limits. Verify and correct this value in the Sample Plan panels, or the default value of the tag/constant field in the SPC Process.

Number of Points Changed To {# points} 3403

This informational message is displayed in the Chart Message Tag to inform you Power SPC has changed the number of points displayed in the chart.

Newest Date Changed to {date/time} 3405

This informational message is displayed in the Chart Message Tag to inform you the chart has been altered so the newest point on the chart correlates to the specified date and time. This message typically is displayed after changing the value of the Newest Date/Time Input Tag.

Oldest Date Changed to {date/time} 3406

This informational message is displayed in the Chart Message Tag to inform you the chart has been altered so the oldest point on the chart correlates to the specified date and time. This message typically is displayed after changing the value of the Oldest Date/Time Input Tag.

Out of RAM 5442

This error message indicates the Power SPC was unable to obtain needed memory. Reduce other system demands and retry.

Panning Chart Forward 3411

This informational message is displayed in the Chart Message Tag to inform you the chart is panning forward. This requires a fetch of data, which may take a few seconds, so this “in-progress” message is displayed.

Panning Chart Forward 3412

This informational message is displayed in the Chart Message Tag to inform you the chart is panning backward. This requires a fetch of data, which may take a few seconds, so this “in-progress” message is displayed.

Panning Turned Off - Returning to Current Time 3413

This informational message is displayed in the Chart Message Tag to inform you panning was turned off. When panning is turned off, Power SPC will return your chart to the current time, which means new data will be fetched. This may take a few seconds, so this “in-progress” message is displayed.

Pass 3301

This message is displayed in the Acceptance Sampling Pass/Fail Status tag. This is the affirmative response to indicate the sample has “passed” the acceptance test.

{Process Name} Process Active 3206

When the SPCDATA task has loaded all necessary configuration information, established a connection to the configured database, and fetched any necessary data, this message is displayed in the Process Message Tag. When this message is displayed, the named process is ready to collect and process SPC data.

{Process Name} Process Already Active 7202

This warning message indicates the Power SPC task has detected a change in the Process Disable Tag. The tag has changed to a zero value, and this triggers the process to activate or enable. This warning is displayed when activating a process which already is in the active state.

{Process Name} Process Already Loaded 3208

This message is displayed in the Process Message tag when the process definition panel has two or more processes defined with the same name. In this situation, the first process definition is loaded into the SPCDATA task, but all subsequent process definition with the same name are ignored.

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{Process Name} Process Already Suspended 7201

This warning message indicates the Power SPC task has detected a change in the Process Disable Tag. The tag has changed to a non-zero value, and this triggers the process to suspend or disable. This warning is displayed when suspending a process which currently is in the suspend state.

{Process Name} Process Suspended 3207

When you disable an SPC Process, SPCDATA does not eliminate the process and remove it from memory. It simply disconnects the process from the database and puts it into a suspended state. When this message is displayed, the named process will not respond to any collection or calculation triggers, but will allow you to change the values of Sample Plan, Subgroup, and the Location Name tags.

Read of CT Header Failed on {CT Header} 5005

This error message indicates Power SPC failed in its attempt to read the named header from the CT. The file exists, but sizes were mismatched or the read operation failed for an unknown reason. Regenerate the CT, or FLREST your application.

Reconcile Auxiliary Data Disabled - Process {process name} active 5322

This error message indicates the named Power SPC process is active and therefore, the utility to update the Auxiliary Database Schema cannot be run. Disable the process and retry.

Required field missing from Aux table: {field} 5443

This error message indicates the schema of the user-defined auxiliary table is missing fields required for Power SPC. This can be resolved by dropping the DIMN_AUX and CHAR_AUX tables, but all data within these tables will be lost. We recommended contacting Customer Support for assistance as this should not normally happen.

RESET Calc Suspend Changes Mode **3355**

This informational message is displayed in the Chart Message Tag to inform you the Suspend Changes Tag has been RESET and all of the tags that were changed while in Suspend Change mode have been reset to the value before Suspend Change Mode was turned on.

Running **3002**

This message will be displayed in the TASK message, which is animated on the RUNMGR screen to indicate the Power SPC task has completed the initialization stage successfully and is ready to start up the Power SPC Processes or Power SPC Charts.

Sample **13012**

The word “Sample” or its equivalent translation into another language. This word can be displayed within other messages that deal with Acceptance Sampling.

{Sample plan name} Sample Plan Loaded **3205**

When the configured Sample Plan has been successfully loaded, the SPCDATA task will inform accordingly.

Sample Size <= 0 **7204**

This warning message indicates the SPCDATA task has detected an invalid sample size for the acceptance sampling configuration. Samples must consist of 1 or more measurements or inspected units. Correct the entry in the Sample Plan panel or the default value of the tag/constant in the SPC Process.

SPC Process **13008**

The words “SPC Process” or their equivalent translation into another language. These words can be displayed within other messages that convey a problem with the configuration.

- **POWER SPC**
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Specs for Cp or Cpk Missing 7209

This warning message indicates the Power SPC task has not found valid specifications (LSL and USL) which are needed to perform Cp and Cpk calculations. Define the specifications for the dimension on which the Cp or Cpk calculations are configured.

Starting 3001

This message will be displayed in the TASK message, which is animated on the RUNMGR screen to indicate the Power SPC task is in initialization stage. This is an “in progress” message.

Stopping 3005

This message will be displayed in the TASK message, which is animated on the RUNMGR screen to indicate the Power SPC task is going through the process of shutting down, such as disconnecting from the database. This is an “in progress” message.

Subgroup 13011

The word “Subgroup” or its equivalent translation into another language. This word can be displayed within other messages that convey a problem with the configuration. It’s intended purpose is to associate raw data with similar characteristics into groups. The database will maintain the value of the Location along with the raw data value and subgroup name.

Tag Changes Ignored While Calc 7545 Suspend Changes is OFF

This warning message indicates the SPCGRAPH task has detected a change to a Calculation Control tag, but is unable to apply this change because the changed tag requires the Suspend Change Tag to be set to ON.

{tag name} Tag not configured 7124

This warning message indicates the Power SPC task encountered a problem accessing a required tag with the given purpose. Configure this tag in the Power SPC panels.

Tag not found in RTDB - {further info} 5451

These error message indicates an indirect reference to a tag cannot be resolved. This is a feature under development that has yet to be enabled. This message should not be displayed.

{taskname} Task Not Enabled 1003

This informational message is displayed in the Task Message Tag to inform you an error occurred during the initialization of the Power SPC task. This message indicates your system has not been authorized to run the Power SPC tasks. To correct this error you must obtain the proper FactoryLink license and configuration sequence.

{taskname} Task ID Not Obtained 1001

This informational message is displayed in the Task Message Tag to inform you an error occurred during the initialization of the Power SPC task. To correct this error, verify the run-time system is executing and the environment variables (FLAPP, FLDOMAIN, FLUSER, and FLNAME) are set correctly.

{taskname} Task Env Not Obtained 1002

This informational message is displayed in the Task Message Tag to inform you an error occurred during the initialization of the Power SPC task. To correct this error, verify the run-time system is executing and the environment variables (FLAPP, FLDOMAIN, FLUSER, and FLNAME) are set correctly.

Transaction 13007

The word “Transaction” or its equivalent translation into another language. This word can be displayed within other messages. The word “transaction” is a database term referring to a group of raw data values logged to the database as a group. The relationship implied by values being accepted into the database together is maintained by Power SPC, however, its meaning to the user is dependent upon the application, and is therefore left to the user to take advantage of this relationship.

- **POWER SPC**
- *Power SPC Messages*
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Unable to Allocate Internal Message Buffer 1007

This informational message is displayed in the Process Message Tag to inform you an error occurred while allocating the internal message buffer. Reduce other demands on systems resources and try again. This message indicates that, except for the log file, Power SPC will not be able to communicate the error messages to you through a message tag.

Unknown Calculation Type: {name} 7302

An invalid calculation type was entered. The type change is ignored and the tag is returned to its former value. To avoid this type of problem, try the Calculation and Chart Scrolling Tags which will automatically switch to the next calculation defined in the sample plan.

Unknown domain referenced by FLDOMAIN environment variable 5441

The FLDOMAIN environment variable is either not set or set to a domain which has not been configured via FLCM. Verify the FLDOMAIN environment variable references a valid domain.

Unsupported Control Limit Calc Type for {...} 7323

This warning message indicates the Power SPC task has determined the type of control limit calculation is unsupported.

Unsupported Feature: {feature} 3160

Although this message should never be displayed, all features that may be implemented in a partial state could produce this message if the code gets executed. An example of this would be the future plans for Power SPC to modify its own configuration in the FLCM Database.

Upper 13013

The word “Upper” or its equivalent translation into another language. This word can be displayed within other messages that convey information about the filter applied during Run Rule evaluation. This word can be input or displayed when dealing with the value of the Filter Tag from the Monitor Control panels for the Power SPC Process or Power SPC Chart configuration.

**Value in {tag name} Tag Exceeds
Maximum Value Allowed**

7131

This warning message indicates the value entered into the given tag overflows the range of valid values for the given tag.

Y-Axis Max < Y-Axis Min

7145

This warning message indicates the Power SPC task has detected that Y-Axis Maximum value is less than the Y-Axis Minimum value. This is invalid and the configuration in the Power SPC Control Chart panel needs to be corrected.

Yes

13001

The word “Yes” or its equivalent translation into another language. Many tags can be set to a YES or NO value, and this is the text to display or match for an affirmative value.

Zooming In (2X)

3414

This informational message is displayed in the Chart Message Tag to inform you the chart is zooming in, or displaying half the number of points.

Zooming Out (2X)

3415

This informational message is displayed in the Chart Message Tag to inform you the chart is zooming out, or displaying double the number of points. This will likely require a fetch of raw data, so it may take a few seconds.

Zoom Off - Returning to Pre-Zoom State

3416

This informational message is displayed in the Chart Message Tag to inform you zoom has been turned off (zoom tag set to 0). When this happens the chart will revert to its default or original state before zooming in or out.

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Print Spooler

The FactoryLink Print Spooler task permits you to direct data to printers or other devices with parallel interfaces, and also to disk files.

The Print Spooler task also provides other features:

- File name spooling (loads file when print device is available, minimizing required memory)
- Management of printing and scheduling functions

Print Spooler receives output from other FactoryLink tasks, such as Alarm Supervisor or File Manager, and sends this output to a printer or disk file.

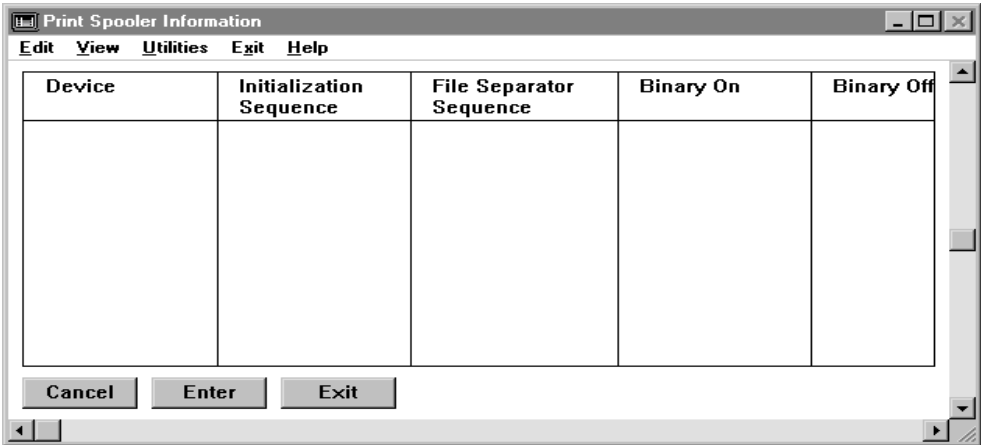
With Print Spooler, you can define up to five devices to receive output from other FactoryLink tasks. To send files to one of these devices, FactoryLink tasks reference the corresponding device number in a configuration table.

- **PRINT SPOOLER**
- *Print Spooler Information Panel*
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PRINT SPOOLER INFORMATION PANEL

Perform the following steps to configure the Print Spooler Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Print Spooler in the Configuration Manager Main Menu to display the Print Spooler Information panel.



- 3 Specify the following information for this panel:

Device Name of the output device. Each line corresponds to a specific device number. For example, line1 = device 1 and line 5 = device 5. With Print Spooler, you can define up to five devices (lines) to receive output from other FactoryLink tasks.

You can assign two or more device numbers to the same physical device. For example, if only one printer is installed and it is attached to parallel port 1, you can enter the same device name for both Device 1 (line 1) and Device 2 (line 2). Print Spooler then recognizes Devices 1 and 2 are the same physical device, and it acts accordingly.

FactoryLink tasks use the first entry in the Print Spooler Information panel as the default output device. For example, when you request a print screen in Run-Time Manager, the output goes to the first device defined the Print Spooler panel.

You can change this default by moving the information for another defined device to the panel's first line using the cut and paste features.

You can also direct output to a file rather than to a port by specifying a path and file name. If Print Spooler writes to an existing file, the new values/text are appended to that file in the specified format.

The Print Spooler task can send output to multiple devices at once.

Use the following formats.

Operating System	Printer Specifications	Path and File Name Format
Windows NT, Windows 95, and OS/2	lpt1 COM1 lpt2 COM2 lpt3 Note: In OS/2 these values must be entered in lower case.	DRIVE:\DIRECTORY\SUBDIRECTORY\FILE.EXT
UNIX	/dev/tty n or /dev/lp n where n is the unit number. *	/DIRECTORY/SUBDIRECTORY/FILE.EXT

Initialization Sequence and File Separator Sequence

Initialization Sequence is defined by entering the action you want it to perform in the Initialization Sequence column of the Print Spooler Information panel. The Initialization Sequence performs the action(s) you define once at the very beginning of a Spooler session.

File Separator Sequence is defined by entering the action you want it to perform in the File Separator Sequence column of the Print Spooler Information panel. The File Separator Sequence performs the action(s) you define at the end of each file of a Spooler session.

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Alphanumeric string of 1 to 16 characters for use only with the Report Generator and File Manager, not for use with the Alarm Supervisor command sequences that automatically send characters to the printers to separate the output of different files. Represent ASCII control characters as two-digit hex value.

These command sequences can consist of two types of characters:

Display characters—Printable ASCII characters, such as A, that can be printed between files.

Control characters—Codes that instruct a printer to perform an action. Control characters have ASCII values from 00 through 1F hexadecimal. To place a control character in a sequence, enter a backslash (\) followed by the two-character hexadecimal value of the control character.

For example, to include a form feed command between files, enter the command sequences as follows (form feed has the ASCII hex value 0C):

Initialization Sequence: '\0C'

File Separator Sequence: '\0C'

The backslash character itself can be entered as two backslashes (\\).

Refer to the user manual for the appropriate printer for information about control characters and their hexadecimal values.

Only one command sequence is necessary to separate the output of two files; therefore, the File Begin Sequence is ignored if it immediately follows a File End Sequence sent to the same output device.

Valid Entry: alphanumeric string of 1 to 16 characters

Binary On Binary
Off

Alphanumeric string of 1 to 16 characters that specifies for use only with the Report Generator and File Manager, not for use with the Alarm Supervisor command sequences sent to the printers to print binary files. Represent ASCII control characters as two-digit hex values.

These command sequences can consist of two types of characters:

Display characters—Printable ASCII characters, such as A, that can be printed between files.

Control characters—Codes that instruct a printer to perform an action. Control characters have ASCII values from 00 through 1F hexadecimal. To place a control character in a sequence, enter a backslash (\) followed by the two-character hexadecimal value of the control character.

For example, the two-digit hex value for the ASCII ESCAPE character is 1B. If, on a particular printer, an ESCAPE character followed by G turns graphics mode ON and ESCAPE followed by g turns it OFF, fill in the command sequences as follows:

Binary On:\1BG

Binary Off:\1Bg

This sequence puts the printer in graphics mode before it begins the print job and takes the printer out of graphics mode upon completion of the print job.

If output is redirected to a disk file (as opposed to a true device), the file opens in append mode before it receives output. If the file does not exist when Print Spooler is first started, it is created if any print jobs are directed to it. The characters written to it are precisely the same as if it were a true device (including all device command sequences). You can use such file redirection to capture output for later examination and/or printing at a time when FactoryLink is shut down.

Valid Entry: alphanumeric string of 1 to 16 characters

Status Tag Element name that contains one of three analog values representing the status of the printing device:

- 0 File print is complete
- 1 Device active
- 2 Error operating device

If you specify more than one device, be sure to distinguish between devices when assigning element names.

Valid Entry: standard tag name

Valid Data Type: analog

Message Tag Element name that contains a message describing the status of the printing device. This element is useful if you want to display the status of a printing device on a graphics screen. To display the status of a printing device on a graphics screen, configure an

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output text object in the Application Editor to contain the value of this element. If you specify more than one device, be sure to distinguish between devices when assigning element names.

Valid Entry: standard tag name

Valid Data Type: message

Caution: All Print Spooler job requests are routed through the /FLAPP/SPOOL directory. If all such requests are not effectively transferred (for instance, if the printer is off-line), this directory can get backlogged. Check the directory periodically and delete any obsolete job requests to ensure effective processing.

Use OS Print Services	Enables the spooler to use a print services configured network printer
Printer Font	Defines the font name to use for printing. This must be a valid printer font. Refer to your printer's documentation for details.
Font Size	Font size to be used for printing, in points.

PRINT SPOOLER MESSAGES

The following status and error messages can be displayed to the right of SPOOL on the Run-Time Manager screen:

Bad CT file *filename*

- Cause:** The task cannot access information in the Print Spooler Information panel. The specified table may be corrupt.
- Action:** Delete /FLAPP/CT/SPOOL.CT. Restart the application to recreate the file.

Bad device number *number* in flags

- Cause:** An incorrect device is specified in a request sent to the Print Spooler.
- Action:** Choose Print Spooler from the Configuration Manager Main Menu. Verify the entries in the Device field of the Print Spooler Information panel are correct. Check the printer device entries in the task configuration tables for any FactoryLink task sending requests to the Print Spooler.

Can't open CT file *filename*

- Cause:** Either the /FLAPP/CT/SPOOL.CT file does not exist or is corrupt.
- Action:** Delete the file if it exists and restart the application to recreate the file. Create it by restarting the application if the file does not exist.

Can't open input file *filename*

- Cause:** The input file may not exist or may be opened by another task.
- Action:** Check that the specified file exists.

Can't open output device *device name*

- Cause:** If the data is being written to a file, an incorrect path may be specified. If the output device is a printer, the printer may be busy.
- Action:** Ensure the specified path is correct if the output device is a file. Check the specified output device (such as a printer) for problems.

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Hard error on device *device name*

- Cause:** A problem exists with the specified output device.
- Action:** Check the specified output device for problems, such as if the printer is off-line.

Illegal flags *flag* for output device *device name*

- Cause:** An incorrect option flag is specified in a request sent to the Print Spooler.
- Action:** Contact Customer Support.

Illegal printer sequence for device name *device name*

- Cause:** An incorrect sequence is entered in the Print Spooler Information panel for the specified device.
- Action:** Choose Print Spooler from the Main Menu. When the Print Spooler Information panel is displayed, ensure the entries in the sequence fields (File Begin, File End, Binary On, Binary Off) are correct for the type of device specified in the Device field.

I/O error writing to device *device name*

- Cause:** The FLAPP/CT/SPOOL.CT file may be damaged or you may have a problem with the output device.
- Action:** Ensure the output device, such as a printer, is functional. When it is, delete FLAPP/CT/SPOOL.CT and restart the application to recreate the file.

No colon in flags

- Cause:** A colon was not included in a request sent to the Print Spooler.
- Action:** Contact Customer Support.

No output devices

- Cause:** No output device is specified in the Print Spooler Information panel.
- Action:** Choose Print Spooler from the Configuration Manager Main Menu. Specify a device in the Print Spooler Information panel. Rerun the application.

Not enough RAM

Not enough RAM to continue task

- Cause:** Not enough RAM is available to perform this task.
- Action:** Close any unnecessary windows or programs, such as the Application Editor or any text editor. Add RAM to the system if this error message occurs often.

Spool: Task initialization failed

- Cause:** Either Print Spooler is already running, a key is not installed, the wrong key is installed, or you are not authorized to have the key.
- Action:** Check that the proper key is installed if you are authorized to have the key.

Spooler backup file too large. New data not saved.

- Cause:** The printer is out of paper or offline. Alarm logging data has been saved to a temporary file. This file holds up to 640,000 bytes of data, and the file has now exceeded this size. Any new alarm logging data is not saved.
- Action:** Put the printer back online or put paper in the printer. When the printer is ready, data saved in the temporary file is spooled to the printer, and the data in the temporary file is deleted. Alarm logging data is spooled to the printer.

Unknown flag *flag* for output device *device name*

- Cause:** An illegal entry is made in the Print Spooler Information panel for the specified output device.
- Action:** Choose Print Spooler from the Configuration Manager Main Menu. Ensure the entries are correct in the Print Spooler Information panel.

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- *Print Spooler Messages*
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Programmable Counters

Use the Programmable Counters task to provide count-per-unit-of-time measurements and to provide event delays, such as defining a trigger to unlock a door and then specifying a delay before the door locks again.

A programmable counter is a group of elements with values that work together to perform a count. Outputs from programmable counters can be used to provide input to Math & Logic programs or other FactoryLink tasks or to trigger Math & Logic programs.

There is no limit, except the amount of memory, to the number of programmable counters that can be defined.

The Programmable Counters task uses either the SHARED or USER domain.

The use of programmable counters requires an understanding of change-status flags. Refer to *FactoryLink Fundamentals* for this discussion.

Principles of Operation

A programmable counter is a group of elements with components that work together to perform a count. Each programmable counter is made up of some or all of the following elements and analog and digital values.

Elements

- Enable—triggers counting activity.
- Up Clock—initiates the count upward.
- Down Clock—initiates the count downward.
- Clear—resets the counted value to the starting point.
- Positive Output—contains the value 1 (on) when the counting limit has been reached.
- Negative Output—contains the value 0 (off) when the counting limit has been reached.
- Current Value—indicates the current value of the count.

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Digital and Analog Values

- Preset Value—analog value that specifies the starting value.
- Increment Value—analog value that specifies the amount by which the count is to increase or decrease each time.
- Terminal Value—analog value that specifies the counting limit.
- AutoClear—digital value that resets the count to the starting point whenever the terminal value is reached.

Counting begins when another FactoryLink task, such as Math & Logic or EDI, writes a 1 (ON) to the Up Clock element. This triggers the Programmable Counters task to move the Current Value toward the Terminal Value by the Increment Value. If the Preset Value is less than the Terminal Value, the Increment is added to the Current Value. If the Preset Value is more than the Terminal Value, the Increment is subtracted from the Current Value.

PROGRAMMABLE COUNTERS INFORMATION PANEL

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Programmable
Counters

Perform the following steps to configure the Programmable Counters Information panel:

- 1 Ensure the domain selected is correct in the Configuration Manager Domain Selection box.
- 2 Choose Programmable Counters in the Configuration Manager Main Menu to display the Programmable Counters Information panel.

Enable	UP Clock	DOWN Clock	Clear	Positive Output

Cancel Enter Exit

- 3 Specify the following information for this panel:
 - Enable Name of an element that enables or triggers counting. If this field is left blank, counting is always enabled because the trigger becomes either the Up Clock or the Down Clock. Counting occurs when the value of Enable is set to 1 (ON). Counting does not occur if the value of Enable is set to 0 (OFF).
 Valid Entry: standard tag name
 Valid Data Type: digital
 - Up Clock Name of an element that causes the value of the Current Value element (present count) to move toward the Terminal Value (count limit). When a 1 (ON) is written to the Up Clock element, the value in the Current Value element is increased by the amount specified by the Increment Value element. If the Preset Value (starting count) is less than the Terminal Value, the

- **PROGRAMMABLE COUNTERS**
- *Programmable Counters Information Panel*
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Increment Value is added to the Current Value. If the Preset Value is greater than the Terminal Value, the Increment Value is subtracted from the Current Value.

At least one type of clock must be defined; that is, an entry is required in either the Up Clock or Down Clock field.

Valid Entry: **standard tag name**

Valid Data Type: **digital**

Down Clock Name of an element that causes the value of the Current Value element (present value) to move away from the Terminal Value (toward the Preset Value). When a 1 (ON) is written to the Down Clock element, the value in the Current Value element is decreased by the amount specified by the Increment Value element. If the Preset Value is less than the Terminal Value, the Increment Value is subtracted from the Current Value. If the Preset Value is greater than the Terminal Value, the Increment is added to the Current Value. The Current Value does not move past the Preset Value and the Positive/Negative Outputs are not triggered when the Preset Value is reached.

At least one type of clock must be defined; that is, an entry is required in either the Up Clock or Down Clock field.

Valid Entry: **standard tag name**

Valid Data Type: **digital**

Clear Name of an element that causes the Current Value to be reset to the Preset Value each time a 1 (ON) is written to it (the Clear element). Each time a 1 (ON) is force-written to the Clear element, a 0 (OFF) is force-written to the Positive Output element and a 1 (ON) is written to the Negative Output element.

Valid Entry: **standard tag name**

Valid Data Type: **digital**

Positive Output Name of an element a 1 (ON) is written to each time the Current Value reaches the Terminal Value. The value of the Positive Output element remains 1 (ON) until a 1 (ON) is written to the Clear element.

Valid Entry: **standard tag name**

Valid Data Type: **digital**

Negative Output	<p>Name of an element a 0 (OFF) is written to each time the Current Value reaches the Terminal Value. The value of the Negative Output element remains 0 (OFF) until a 1 (ON) is written to the Clear element. This tag is set to 1 at task startup.</p> <p>Valid Entry: standard tag name</p> <p>Valid Data Type: digital</p>
Current Value	<p>Name of an element to specify the name of an element that contains the current value of the counter. This value is always between the Preset Value and the Terminal Value.</p> <p>Valid Entry: numeric value between -32768 and 32767 (default = 0)</p> <p>Valid Data Type: analog</p>
Preset Value	<p>Number between -32768 and 32767 that specifies the starting value for a count. This numerical value is written to the Current Value element whenever the value of the Clear element is set to 1 (ON).</p> <p>Valid Entry: numeric value between -32768 and 32767 (default = 0)</p>
Increment Value	<p>Number between -32768 and 32767 that specifies the numerical value that is combined with the Current Value when the Up or Down Clock is triggered.</p> <p>Valid Entry: numeric value between -32768 and 32767 (default = 1)</p>
Terminal Value	<p>Number between -32768 and 32767 that defines the numerical value that specifies a limit for counting activity. When the Current Value is the same as the Terminal Value, counting stops and Positive and Negative Outputs are triggered. Counting remains stopped until the Clear element is triggered. However, if AutoClear is set, a Clear is performed immediately after the Positive and Negative Outputs are triggered.</p> <p>Valid Entry: numeric value between -32768 and 32767</p>
Autoclear	<p>Indicates that a Clear should be performed each time the Terminal Value is reached. This can be one of the following:</p> <p>YES Clear is performed each time the Terminal Value is reached. This is the default.</p> <p>NO Current Value remains equal to the Terminal Value until Clear is triggered.</p>

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 - *Programmable Counters Information Panel*
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- 4 Click on Enter to save the information.
 - 5 Click on Exit to return to the Main Menu.

PROGRAMMABLE COUNTERS MESSAGES

The following messages may be displayed in the STATUS field at the right of COUNTER on the Run-Time Manager screen:

Can't start process 'COUNTER'

Cause: The default number of processes may be less than FactoryLink requires to start up because the operating system parameters were not set properly during FactoryLink installation and setup. This message is displayed when starting FactoryLink in the SHARED domain.

Action: Contact Customer Support.

Corrupt configuration table index

Cause: The /FLINK/CT/CNT.CT file is damaged.

Action: Delete the file. Restart the application to rebuild the file.

Corrupt data in information panel

Cause: The /FLINK/CT/CNT.CT file is damaged.

Action: Delete the file. Restart the application to rebuild the file.

Invalid CT record size

Cause: The /FLINK/CT/CNT.CT file has been damaged.

Action: Delete the file. Restart the application to rebuild the file.

No counter tag defined

Cause: You did not define an Up Clock, Down Clock, or Clear element.

Action: Define at least one of the elements listed above.

No counters defined

Cause: You have not defined any counters for the Programmable Counters task.

Action: Perform one of the following:

1. Choose Programmable Counters from the Main Menu. Use the Programmable Counters Information panel to add one or more triggers.

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- *Programmable Counters Messages*

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2. Choose System Configuration from the Main Menu. If the Counters task will not be used, remove the R flag from the Counter task row in the System Configuration Information panel.

No tables configured for this task

Cause: FLINK/CT/CNT.CT does not exist or cannot be opened. The installation may not have completed successfully or the file may have been damaged.

Action: Delete the file. Restart the application to rebuild the file.

Out of RAM

Cause: No more memory is available.

Action: Close any unnecessary windows or programs, such as the Application Editor or any text editor. Add memory to the system if this error message occurs often.

Value tag must be analog

Cause: The data type of the Current Value element is invalid.

Action: Choose Programmable Counters from the Configuration Manager Main Menu. Ensure the Current Value element defined in the Programmable Counters Information panel is an analog element.

Report Generator

Data collected or computed by FactoryLink is stored as data elements in a real-time database. Each time data is collected or computed, the value stored in the real-time database for an element is overwritten by the new data.

If you want to report on the data, you can write the data to a report file as it is received using Report Generator. Report Generator is a flexible reporting tool that lets you define custom reports according to your own specific needs. The data included on the report can be generated as a disk file, a printed report, or exchanged with other programs that accept ASCII files.

Components of a Format File

User-defined ASCII format files control the look of the report as well as its contents. For every report generated by Report Generator, there is a unique format file defined. Refer to “Report Generator Format Panel” in this chapter for descriptions of the format file components.

Keywords

Keywords are used in the format file to trigger an action. When the trigger executes, the associated section of the format file is processed and written to a temporary working file. There are three keywords used in format files.

- .BEGIN
- .REPEAT
- .END

Keyword lines begin with a period (.), followed by a keyword and a line terminator such as LF (Line Feed) or CR, LF (Carriage Return, Line Feed) sequence.

Comment lines can also be included in the format file by starting the line with a period and following it with any text that does not represent a keyword. Text displayed in a comment line is not included on the report.

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Placement of Reported Data

Data specified in the format file is collected from the real-time database and placed into the report. Placement of real-time database values is determined by the following.

- Location of its object name in the format file
- Format specifiers

Trigger Actions

When a .BEGIN, .REPEAT or .END trigger executes, the associated section of the format file is processed and written to a temporary working file.

Report Format Variations

A simple variation on the report used in the previous example can be generated by not specifying an event or trigger for the begin section. This would typically be used if no header type information is necessary. An end section must always be specified.

Another common format for reports is a snapshot report. The purpose of this type of report is to gather information and generate a printed report by triggering a single event.

Complete Triggers

FactoryLink returns a complete status for each of the triggered events once the operation has completed.

- The operation is considered completed for begin and repeat sections when the information is written into the temporary file.
- The operation is considered completed for the end section when the temporary file is sent to the specified device (printer, communication port or disk file).

The complete status allows you to effectively coordinate report generator operations with other FactoryLink tasks and to display the status to the operator.

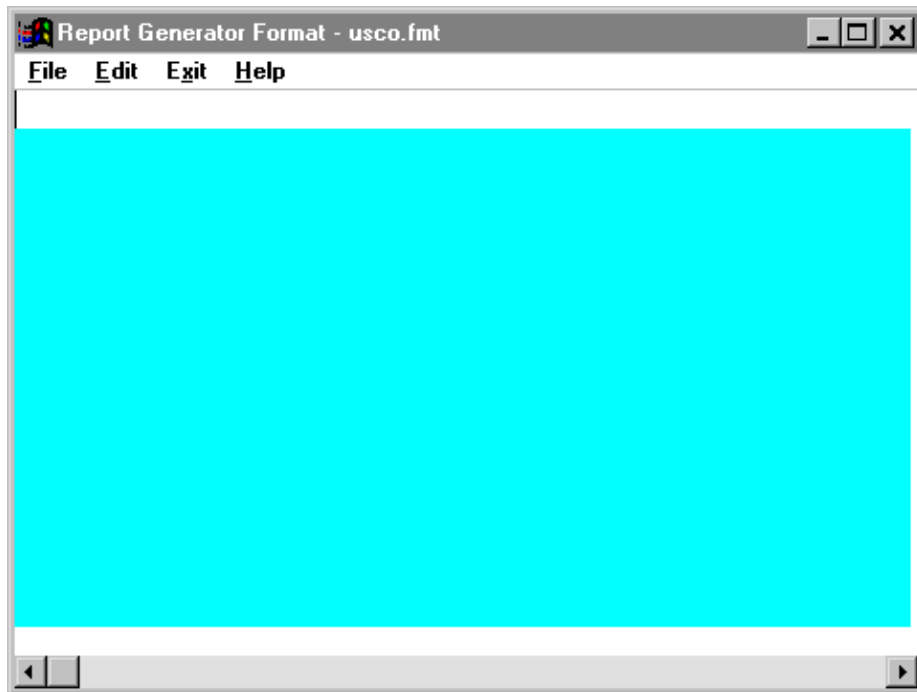
Escape Sequences

Escape sequences send instructions to the printer, such as backspaces, form and line feeds, carriage returns, or horizontal tabs. These sequences can also be used to change operating modes of printers to compressed versus standard print.

REPORT GENERATOR FORMAT PANEL

A format file is required to determine the placement of the generated data when a reporting operation is triggered for Report Generator. This format file is created in the Report Generator Format panel, a free-form text entry panel.

You must define a unique format file for every report. Format files are stored by default in the FLAPP/rpt directory as *filename.fmt* where *filename* is the name you assign to the format file.



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Report Generator

Following are steps to insert field information along with field descriptions for this panel.

- 1 Optionally, enter a comment in the comment section starting with the first line of the format file panel. The comment section extends to the first line starting with a keyword. Each line in the comment section cannot exceed 512 characters. It is not necessary to precede comments in this section with a period.

A comment can reference the format file or the report you are configuring.

- **REPORT GENERATOR**

- *Report Generator Format Panel*

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- 2 Optionally, define a begin section by entering the keyword `.BEGIN` followed by text you want as the header for the report. In this section you can enter the name of the report, column names, and any other fixed data. You can also include object names, such as date and time. Use the conventions defined in the Report Generator Overview in the *Data Reporting Configuration Guide* for referencing object names.

You are not required to include a begin section.

- 3 Define a repeat section by entering the keyword `.REPEAT` followed by any text and names of objects you want included on the report. You can include both text and object names in this section. Use the conventions defined in the Report Generator Overview in the *Data Reporting Configuration Guide* for referencing object names. The contents of this section can be repeated on the report any number of times. This section is repeated each time the repeat trigger is activated.

You are not required to include a repeat section.

The repeat section is completed when the last object name is read and sent to the temporary file at the end of the first shift.

- 4 Define an end section by entering the keyword `.END` followed by text and object names you want included at the end of the report. Use the conventions defined in the Report Generator Overview in the *Data Reporting Configuration Guide* for referencing object names.

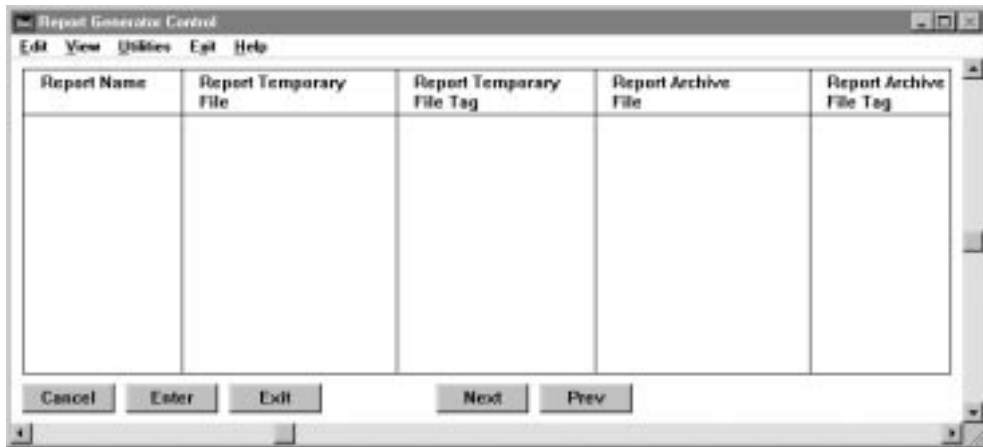
At a minimum, a report format file must include an end section. If you include only an end section in the report format, you generate a snapshot report.

- 5 Optionally, enter an escape sequence to specify instructions to the printer. If you choose not to enter an escape sequence, the report prints exactly as defined in this format file. Refer to the Report Generator Overview in the *Data Reporting Configuration Guide* for a list of escape sequences.

REPORT GENERATOR CONTROL PANEL

Perform the following steps to configure the Report Generator Control panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Report Generator in the Configuration Manager Main Menu to display the Report Generator Control panel.



- 3 Specify the following information for this panel:

Report Name Name of the report. This name must match the name entered in the File Name field of the format file. Do not include the .fmt extension.

Valid Entry: **report name**

Report Temporary File Name of the file used to recover temporary report files in the event of abnormal termination. Leave this field blank unless such recovery is necessary. Report Generator uses the name of the report defined in the Report Name field with an .rpt extension as the temporary file name. This file is placed in the following directory path:

FLAPP/FLNAME/FLDOMAIN/FLUSER/rpt

If you need to recover temporary working files in the event of abnormal termination, enter the name to assign to the temporary working file created when the report is started. This name should

- **REPORT GENERATOR**
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include the directory path where you want the temporary file opened. This path cannot exceed 32 characters. The directory path must exist with proper permissions prior to running the report.

Use variable format specifiers as part of the path and file name. Using variable format specifiers in the definition allows you to create new temporary files without overwriting previously created temporary files. Refer to the Report Generator Overview in the *Data Reporting Configuration Guide* for details on variable specifiers used with Report Generator.

When the report is triggered and the temporary file is created, the format specifier included in the definition is replaced by the value defined in the Report Temporary File Tag. If you specify a variable specifier as part of the path or file name, you must define the Report Temporary File Tag field.

Report Temporary File Tag Name of a tag that contains the value to use to replace the variable specifier defined in the Report Temporary File field in this panel.

If you left this field blank and used a variable specifier when you defined the temporary file name, the variable specifier is interpreted as a literal.

Make the variable specifiers the same tag type as their corresponding data elements.

Valid Entry: standard tag name (default = analog)

Valid Data Type: digital, analog, longana, float, message

Report Archive File Name to identify the permanent report file created when the report completes. The contents of the temporary working file are written to this file.

If you leave this field blank, Report Generator does not save the report and deletes the temporary file when the reporting operation completes. The report can no longer be accessed.

This name can include the directory path where you want the file created. The directory path must exist with proper permissions prior to running the report. If you do not define a directory path, the report is created in the following directory path:

FLAPP/FLNAME/FLDOMAIN/FLUSER/rpt

You can use variable specifiers as part of the path and file name. Using variable specifiers in the definition allows you to generate reports without overwriting previously generated reports. Refer to the Report Generator Overview in the *Data Reporting Configuration Guide* for details on variable specifiers used with Report Generator.

When the report completes and the permanent file is created, the format specifier included in the definition is replaced by the value defined in the Report Archive File Tag. You must define the Report Archive File Tag field if you specify a variable specifier as part of the path or file name.

The next time the reporting operation completes and the temporary file is written to this archive file, the file is overwritten if you configure the report archive file name without variable specifiers.

Valid Entry: permanent report file name

Report Archive File
Tag

Name of a tag that contains the value to use to replace the variable specifier defined in the Report Archive File field on this panel.

If you left this field blank and used a variable specifier when you defined the archive file name, the variable specifier is interpreted as a literal.

Make the variable specifiers the same tag type as their corresponding data elements.

Valid Entry: standard tag name (default = analog)

Valid Data Type: digital, analog, longana, float, message

Begin Trigger

Name of a digital tag that triggers execution of the begin section of the format file. Leave this field blank if your report does not include a begin section.

If you leave this field blank and the format file contains a begin section, the begin section is triggered by the end trigger.

When this tag value is forced to 1 (ON), data defined in the begin section of the format file is written to the temporary file defined in the Report Temporary File field.

Valid Entry: standard tag name

Valid Data Type: digital

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- *Report Generator Control Panel*

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Begin Complete Name of a digital tag that contains the status of the begin operation. When the begin section of the report completes, Report Generator force-writes this tag to 1. Execution of the begin section is considered complete when the contents of the begin section are written to the temporary file.

Leave this field blank if your report does not include a begin section or if you do not want to maintain the status of the begin operation.

Valid Entry: standard tag name

Valid Data Type: digital

Repeat Trigger Name of a digital tag that triggers the execution of the repeat section of the format file. Leave this field blank if your report does not include a repeat section.

If you leave this field blank and the format file contains a repeat section, the repeat section is triggered by the end trigger.

When this tag value is forced to 1 (ON), data defined in the repeat section of the format file is written to the temporary file defined in the Report Temporary File field.

Valid Entry: standard tag name

Valid Data Type: digital

Repeat Complete Name of a digital tag that contains the status of the repeat operation. When the repeat section of the report completes, Report Generator force-writes this tag to 1.

Execution of the repeat section is considered complete when the contents of the repeat section are written to the temporary file.

You can use this tag to coordinate activities between Report Generator and other FactoryLink tasks. Leave this field blank if your report does not include a repeat section or if you do not want to maintain the status of the repeat operation.

Valid Entry: standard tag name

Valid Data Type: digital

End Trigger Name of a digital tag that triggers the execution of the end section of the format file. You can never leave this field blank. All reports require an end trigger.

When this tag value is forced to 1 (ON), data defined in the end section of the format file is written to the temporary file defined in the Report Temporary File field. If the format file contains begin

and repeat sections, but begin and repeat triggers are not defined, the end trigger executes these sections before executing the end section.

Once the end section is executed, the contents of the temporary file are sent to its configured destination and the temporary file is deleted.

Valid Entry: **standard tag name**

Valid Data Type: **digital**

End Complete Name of a digital tag that contains the status of the end operation. When the repeat section of the report completes, Report Generator force-writes this tag to 1.

Execution of the end section is considered complete when the contents of the end section are written to the temporary file.

You can use this tag to coordinate activities between Report Generator and other FactoryLink tasks. Leave this field blank if you do not want to maintain the status of the end operation.

Valid Entry: **standard tag name**

Valid Data Type: **digital**

Printer Device Number between 1 and 5 that corresponds to the printer, as defined in the Print Spooler table, where you want to print the report (if you want to print the report when report processing completes). You can direct reports to any of five different spooler devices specified in the Print Spooler Information panel. Refer to the Print Spooler part of this manual for details on printer definitions.

Leave this field blank or enter a 0 if you do not want to print the report.

Valid Entry: **numeric value of up to 5**

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

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REPORT GENERATOR INFORMATION PANEL

Perform the following steps to configure the Report Generator Information panel:

- 1 Ensure the domain selection is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Report Generator in the Configuration Manager Main Menu to display the Report Generator Information panel.

Tag Name	Object Name	Format	

Report Name:

Note: You are limited to 256 characters when formatting a line in the report.

- 3 Specify the following information for this panel:

Tag Name Name of a data element you want included in the report. The value of this tag is written to the report in place of the object name holder defined in the format file. Tag names can be the same as the object names or they can be different.

Valid Entry: standard tag name (default = message)

Valid Data Type: digital, analog, longana, float, message

Object Name Name of the object exactly as defined in the report format file.

Format A variable specifier that indicates how to format the data in Tag Name when written to the report. This field is limited to 12 characters. Valid formats depend on the tag type of the real-time element and the required output. Refer to the *FactoryLink Fundamentals* for details on variable specifiers.

If you leave this field blank, the value of the data element is displayed as it exists in the real-time database.

If the tag type of the data element is digital, you can specify a character string to be displayed depending on the digital's value. A typical use might be to indicate valve status of ON or OFF rather than a 1 or 0.

To do this, enter the desired character strings for each condition (one string for each possible value, 0 and 1) in the following format:

open|closed

where

open specifies the message, open, to print when the tag value is 1 (ON)

closed specifies the message, closed, to print when the tag value is 0 (OFF)

Valid Entry: specifier of up to 12 characters

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **REPORT GENERATOR**
- *Report Generator Messages*
-
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REPORT GENERATOR MESSAGES

If any problems are encountered by the Report Generator during run time, an error message is displayed in the Run-Time Manager screen next to the name of the Report Generator task in the SHARED domain window.

This section lists all messages that can occur during the Report Generator run time, describes their possible causes, and provides corrective actions.

Archiving report *report_name*

Cause: A status message indicating *report_name* is in the process of being archived.

Action: The archive_file associated with *report_name* is present in the specified location.

Action: None.

Bad header in CT file *report_name*

Cause: The CT entry associated with *report_name* is corrupt.

Action: Run `ctgen -v2 rpt`. Note any errors and make corrections, if necessary.

Bad prt device # %d in rpt %d

Cause: The device number %d is not a valid spool device.

Action: Ensure the device number specified has a corresponding entry in the Spooler task panel. This number represents the physical order in the Spooler panel.

Bad type in CT file *report_name*

Cause: An unsupported or mismatched tag type is specified in the *report_name* entry in the Report Generator panel.

Action: Verify panel entries. Force a regeneration of the CT file to ensure its integrity by running `ctgen -v2 rpt`. Note any errors and make corrections.

Can't open CT file *report_name*

Cause: The CT entry associated with *report_name* is either corrupt or non-existent.

Action: Verify Report Generator tables were configured in the SHARED domain. Regenerate the CT file by running `ctgen -v2 rpt` and note any errors or correction to be made.

Can't open input file *format_file*

Cause: The *format_file* specified in the configuration panels in the Report Generator Format file entry and the *report_name* do match or the *format_file* for the specified *report_name* does not exist.

Action: Ensure a one to one correspondence between the *format_file* names and the *report_name* entries. Verify spelling and syntax.

Can't open output file *archive_file*

Cause: The file specified in the *archive_file* can not be created.

Action: The path specified in the *archive_file* column must be created prior to running the Report Generator task. Ensure a valid path is resolved if a format specifier is used in the Archive file entry.

Can't spool output file *report_name*

Cause: The Report Generator is unable to send the report generated by the *report_name* entry to the Spooler task.

Action: Ensure the spooler device specified in the Report Generator exists and the Spooler task is running with no errors.

Error reading configuration table record

Cause: Unable to read information in the Report Generator Information panel.

Action: Run `ctgen -v2 rpt`. Note any errors and make corrections if necessary.

- **REPORT GENERATOR**
- *Report Generator Messages*
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Error writing file *archive_file*

Cause: The file specified in the *archive_file* can not be created or closed.

Action: The path specified in the *archive_file* column must be created prior to running the Report Generator task. Ensure a valid path has been resolved if a format specifier is used in the *archive_file* entry. Ensure the SHARED domain user has permission for the specified file and directory.

Generating report *report_name*

Cause: A status message reporting that *report_name* is in the process of being generated. The Temporary file associated with *report_name* is present in the specified location.

Action: None.

Gen Info panel exceeds 2048 records per report

Cause: More than 2048 entries exist in the Information panel for a given report.

Action: Reduce the number of objects in the identified report file.

Invalid file size for CT file *report_name*

Cause: The CT entry associated with *report_name* is corrupt.

Action: Run `ctgen -v2 rpt`. Note any errors and make corrections if necessary.

No Report Generator Information panel data

Cause: No information is in the Report Generator Information panel.

Action: Verify information is displayed in the Information panel. Even if an object is not defined within the *format_file*, one entry should be entered.

No reports configured

Cause: No valid reports can be resolved.

Action: Ensure the report generator panels are configured in the SHARED domain. Force the regeneration of the CT file by running `ctgen -v2 rpt` noting any errors.

No reports configured

- Cause: No valid reports can be resolved.
- Action: Ensure the report generator panels are configured in the SHARED domain. Force the regeneration of the CT file by running `ctgen -v2 rpt` noting any errors.

No trigger exists for a report

- Cause: The panel entries associated with *report_name* does not have the minimum requirement of an end trigger defined.
- Action: Enter the Report Generator Control panel and ensure at least an end trigger is specified for the entry specified for *report_name*.

No triggers in CT file *report_name*

- Cause: The panel entries associated with *report_name* does not have the minimum requirement of an end trigger defined.
- Action: Enter the Report Generator Control panel and ensure at least an end trigger is specified for the entry specified for *report_name*.

Out of RAM

- Cause: The report generator can not obtain enough RAM to load the CT file and the associate format files.
- Action: Free system resources to ensure enough memory exists.

Printing report *report_name*

- Cause: A status message reporting that *report_name* is in the process of being spooled to the FactoryLink Spooler task. The printed report should be generated if the Spool task is activated and all associated hardware is in working condition
- Action: None.

Reading CT file *report_name*

- Cause: A status message reporting that the CT file for *report_name* is being loaded into memory.
- Action: None.

- **REPORT GENERATOR**
- *Report Generator Messages*
-
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Task initialization failed

Cause: The Report Generator task is unable to register with the FactoryLink kernel.

Action: Ensure the application is running. Start the SHARED domain of FactoryLink with a -d argument and note any errors as the Report Generator is starting.

Trigger table error

Cause: The watch list for all trigger tags generated an internal error.

Action: Regenerate the CT file by using ctgen -v2 rpt and note any errors.

Scaling and Deadbanding

The Scaling and Deadbanding task (SCALE.EXE) is used to convert, or scale, incoming raw data to a different value range and to indicate a dead or non-recalculating band around a scaled value.

The linear scaling feature of the task is used to convert or scale the incoming raw data to a different value range. Many values read from a programmable logic controller (PLC) are in units other than those the user wishes to display, manipulate and/or archive. Use of the scaling task eliminates the need to process data through an intermediate routing mechanism and the need to write code to perform the scaling function when the scaling is linear. The scaling task, if given ranges for the incoming and desired data values, can derive the necessary conversion factor and/or offset and perform the linear scaling calculations automatically using the formula:

$$mx + b = y$$

where x is the raw value, m is the multiplier, b is a constant and y is the result.

The Deadbanding task is used to indicate a band, or area, around a value small enough to be considered insignificant. In this case, the new value is stored and a new deadband recalculated, but the new value is not written to the program database. Since FactoryLink tasks process values upon every change, deadbanding provides a means of saving processing time and improving system efficiency. Note that the deadbanding portion of the function cannot be implemented without configuring the scaling portion of the function.

Refer to the *FactoryLink ECS Application Editor* for more information on how the Scaling and Deadbanding feature works in the Application Editor.

Principles of Operation

Scaling is only available in the SHARED domain. The scaling function only applies for tags with an analog, longana or float data type.

Scaling is configured using a pair of ranges:

- one for raw values
- one for scaled values.

- **SCALING AND DEADBANDING**
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These ranges can be specified as constants or tags. If one or more of the range tags is changed, the scaling formula is adjusted accordingly.

If Scaling and Deadbanding is configured from the Application Editor, the system automatically assigns default tag names for raw and scaled values, even if entered as a constant, deadbanding and scaling lock functions. However, if Scaling and Deadbanding is configured from within the Configuration Manager, only those tags specified by the designer are created.

When a value is written to a raw value tag, its related scaled value tag is updated accordingly. When a value is written to a scaled value tag, its raw value tag is updated accordingly. The former is called a raw-to-scaled conversion. The latter is called a scaled-to-raw conversion.

Prior to changing a range tag, raw value tag or scaled value tag, the function should be disabled using the Scaling Lock Tag. When the Scaling Lock Tag has a non-zero value, changes made to the tag are not propagated to their related members. After the changes to that function have been made and the function has been re-enabled, the current raw value is scaled and written to the scaled value tag. Any changes to the ranges are applied to the scaled value as well.

Deadbanding, which applies to raw-to-scaled conversion but not to scaled-to-raw conversion, may be specified in one of two ways: as an absolute (ABS) number of Engineering Units (EUs) or as a percentage (PCT) of the scaled range. During raw-to-scaled conversion, a newly calculated scaled value that does not exceed the deadband will not be written to the database. If deadbanding is being applied to a tag associated with scaling rather than a specific alpha-numeric range, then deadbanding should be specified by a percentage of a range rather than as an absolute value. If the deadband variance for a scaled tag is specified as an absolute value, then no deadbanding is applied to the associated raw tag.

For this example, assume the temperature of the liquid in a tank is being monitored. The tank temperature probe records raw (incoming) data on a Celsius scale. The operators monitoring the temperature are more familiar with the Fahrenheit scale and wish to have the data displayed on that scale.

The temperature never falls below freezing or above the boiling point.

SCALING AND DEADBANDING INFORMATION PANEL

Perform the following steps to configure the Scaling and Deadbanding Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Scaling and Deadbanding in the Configuration Manager Main Menu to display the Scaling and Deadbanding Information panel.

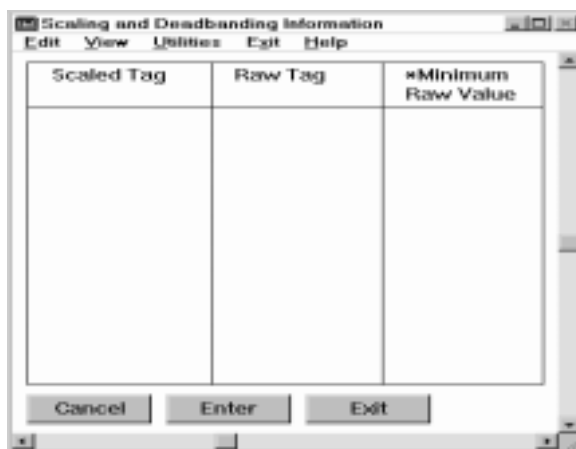
Scaled Tag	Raw Tag	*Minimum Raw Value	*Maximum Raw Value	*Minimum Eng. Unit	*Maximum Eng. Unit

Cancel Enter Exit

- 3 Specify the following information for this panel:

Scaled Tag	Tag for the field scaled values will be written to.
Raw Tag	Tag for the field raw values are to be read from.
Minimum Raw Value	Lowest value for raw data. Either a constant value or a tag can be specified in this field.
Maximum Raw Value	Highest value for raw data. Either a constant value or a tag can be specified in this field.
Minimum Eng. Unit	Lowest value for scaled data. Either a constant value or a tag can be specified in this field.
Maximum Eng. Unit	Highest value for scaled data. Either a constant value or a tag can be specified in this field.

- **SCALING AND DEADBANDING**
- *Scaling and Deadbanding Information Panel*
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- Deadband Value** Amount, in either absolute value or percent of total value that, when applied, creates a range on either side of the value in which the recalculated value does not have to be written to the database.
- Deadband Abs./Pct.** Absolute or Percentage to indicate if the deadband value specified is an absolute number of engineering units (EUs) or a percentage of the scaled value range.
- Scaling Lock Tag** Use this field to temporarily disable the scaling feature for the scaled tag. When the Scaling Lock Tag has a nonzero value, changes made to the tag are not propagated to their related members. After the changes to that function have been made and the function has been reenabled, the current raw value is scaled and written to the scaled value tag.

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

SCALING AND DEADBANDING ERROR MESSAGES

This chapter lists all messages that can occur during Scaling and Deadbanding run time, describes their possible causes, and provides corrective actions.

Error reading CT record

Cause: The file SCALE.CT is corrupt.
Action: Rebuild SCALE.CT using CTGEN.

Error%d: Unknown signal%d received

Cause: This is a FactoryLink internal error.
Action: Operation will be unaffected by this error. Please report error to Customer Support.

Insert tag into DTP tag list failed

Cause: This is a FactoryLink internal error.
Action: Operation will be unaffected by this error. Please report error to Customer Support.

Invalid deadband tag

Cause: The file SCALE.CT is corrupt.
Action: Rebuild SCALE.CT using CTGEN.

Invalid deadbanding lock tag

Cause: The file SCALE.CT is corrupt.
Action: Rebuild SCALE.CT using CTGEN.

Invalid maximum raw tag

Cause: The file SCALE.CT is corrupt.
Action: Rebuild SCALE.CT using CTGEN.

Invalid maximum scaled tax

Cause: The file SCALE.CT is corrupt.
Action: Rebuild SCALE.CT using CTGEN.

- **SCALING AND DEADBANDING**
- *Scaling and Deadbanding Error Messages*
-
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Invalid minimum raw tag

Cause: The file SCALE.CT is corrupt.

Action: Rebuild SCALE.CT using CTGEN.

Invalid minimum scaled tag

Cause: The file SCALE.CT is corrupt.

Action: Rebuild SCALE.CT using CTGEN.

Invalid raw tag

Cause: The file SCALE.CT is corrupt.

Action: Rebuild SCALE.CT using CTGEN.

Invalid scaled tag

Cause: The file SCALE.CT is corrupt.

Action: Rebuild SCALE.CT using CTGEN.

Invalid scaling lock tag

Cause: The file SCALE.CT is corrupt.

Action: Rebuild SCALE.CT using CTGEN.

No CT

Cause: The file SCALE.CT is missing

Action: Rebuild SCALE.CT with CTGEN.

No CT table #0

Cause: The file SCALE.CT is corrupt.

Action: Rebuild SCALE.CT using CTGEN.

No deadbanding lock tag or value

Cause: The file SCALE.CT is corrupt.

Action: Rebuild SCALE.CT using CTGEN.

No deadband tag or value

Cause: The file SCALE.CT is corrupt.

Action: Rebuild SCALE.CT using CTGEN.

No maximum raw tag or value

Cause: The file SCALE.CT is corrupt.

Action: Rebuild SCALE.CT using CTGEN.

No maximum scaled tag or value

Cause: The file SCALE.CT is corrupt.

Action: Rebuild SCALE.CT using CTGEN.

No minimum raw tag or value

Cause: The file SCALE.CT is corrupt.

Action: Rebuild SCALE.CT using CTGEN.

No records in CT table #0

Cause: The file SCALE.CT is corrupt.

Action: Rebuild SCALE.CT using CTGEN.

No minimum scaled tag or value.

Cause: The file SCALE.CT is corrupt.

Action: Rebuild SCALE.CT using CTGEN.

No raw tag or value

Cause: The file SCALE.CT is corrupt.

Action: Rebuild SCALE.CT using CTGEN.

No scaled tag or value

Cause: The file SCALE.CT is corrupt.

Action: Rebuild SCALE.CT using CTGEN.

- **SCALING AND DEADBANDING**
- *Scaling and Deadbanding Error Messages*
-
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No scaling lock tag or value

Cause: The file SCALE.CT is corrupt.

Action: Rebuild SCALE.CT using CTGEN.

No tables in CT

Cause: The file SCALE.CT is corrupt.

Action: Rebuild SCALE.CT using CTGEN.

Out of memory

Cause: The system does not have sufficient memory to run the process.

Action: Free up memory by halting other running programs on the system and try running FactoryLink again.

Record%d: FPE 0x%04X occurred

Cause: There may be a problem with the hardware Floating Point Processor on the system.

Action: Have the Floating Point Processor evaluated.

Record%d: Raw range is zero

Cause: The record cannot be processed because the minimum and maximum raw values are equal, resulting in a range of 0(zero).

Action: Change one of the raw values to create a range greater than 0.

Record%d: Raw value is outside range

Cause: The raw data value received is less than the minimum or greater than the maximum specified. Scaling will continue, but the scaled value will be outside the range.

Action: Change the raw value range to allow encompassing values outside the range.

Record%d: Scaled range is zero

Cause: The record cannot be processed because the minimum and maximum scaled values are equal, resulting in a range of 0 (zero).

Action: Change one of the scaled values to create a range greater than 0.

Recorded: Scaled value is outside range

- Cause:** The scaled data value calculated is less than the minimum or greater than the maximum specified.
- Action:** Change the scaled value range to allow encompassing values outside the range.

- **SCALING AND DEADBANDING**
- *Scaling and Deadbanding Error Messages*
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In FactoryLink, the relational databases are configured in a table format consisting of rows and columns. The schema of the table defines the number, size, and content of the rows and columns.

Database vs. Data-Point Logging

FactoryLink depends on the data logging method used for defining a table structure schema. Prior to configuring the logging function you should determine which logging task you will be using for a particular situation.

Database Logging is best for situations when you want to

- Log all tags when any tag changes or is triggered
- Simultaneously log a group of like (logically associated) tags
- Group data logged based on some criteria
- Configure a table column to be a dynamic pen on a trend chart

Data-Point Logging is best for situations when you want to

- Log a tag only when its value changes
- Use preconfigured tables and eliminate the time spent setting up tables
- Be able to index on log time or tag name or both
- Sort all logs of a tag in order of occurrence
- Configure a tag to be a dynamic pen on a trend chart
- Dynamically change the list of tags being logged during run time

For example, if you have a tank you are monitoring the process temperature in with a single probe in the tank, you would use Data-Point Logging to track the tag value. If you have six probes in the same tank and you want to see the value returned from each probe at a given point in time, you would use the Database Logging task.

Refer to FactoryLink ECS Fundamentals Guide Chapter 87, “Database Logging Task Definition” and “Chapter 88, “Data-Point Logging Task Definition” in *FactoryLink Fundamentals* to determine which logging method to use for your application before configuring a table.

- **SCHEMAS**

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Trending

The referenced database table must be configured in the Trend Database Tables panel and either the Database Logging function or the Data-Point Logging function if you are using the Trend database. The Data-Point and Database Trend tables are mutually exclusive; therefore, a single table cannot be configured in both functions.

Database Logging Schemas

When you log data to FactoryLink Database Logging, in addition to logging the data, you may find it useful to:

- Group certain data together (grouping)
- See the order data was logged or the actual time a data event occurred (sequencing or ordering)
- Sort the records into a particular order, such as alphabetical, before viewing them (indexing)

When planning your database tables, determine if you will use these options so you can specify appropriate columns.

DATABASE SCHEMA CREATION TABLE

In FactoryLink the structure of a table being created is controlled by its schema definition. Schema definitions are created in the Database Schema Creation table. There are four panels in this table:

- Schema Control panel—Assigns unique names to the table structures that can be used to log data. Field descriptions for this panel are provided in “Schema Control Panel” on page 496.
- Schema Information panel—Defines the columns and their attributes included in the table structure. Field descriptions for this panel are provided in “Schema Information Panel” on page 498.
- Index Information panel—Defines which columns are used as the index for the table structure. If you are not indexing the table, do not fill out this panel. Field descriptions for this panel are provided in “Index Information Panel” on page 502.
- Security Event Logging panel—Defines what information is recorded about each security event that occurs. Field descriptions for this panel are provided in “Security Event Logging Schema Panel” on page 504.

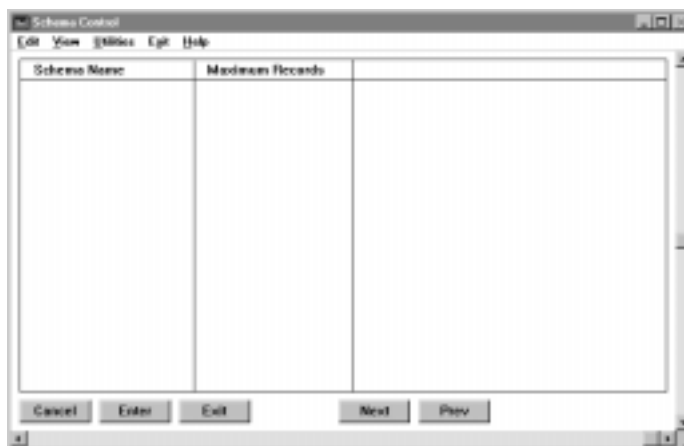
The Database Schema Creation table is configured in the SHARED domain.

- **SCHEMAS**
- *Schema Control Panel*
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SCHEMA CONTROL PANEL

Perform the following steps to configure the Schema Control panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Database Schema Creation in the Configuration Manager Main Menu to display the Schema Control panel.



- 3 Specify the following information for this panel:

Schema Name Alphanumeric name of 1 to 19 characters to reference a unique table structure. For dBASE IV Historian, limit the name to 10 characters.

Valid Entry: alphanumeric name of 1 to 19 characters

Maximum Records Record rollover occurs when the maximum is reached. If you are logging nongrouped data to a dBASE IV Historian and if you want to control the number of records allowed in the tables using this schema, enter a number in this field that defines the maximum number of records allowed. Leave this field blank to use as many records as your disk space allows.

Leave this field blank if you are logging grouped data. This field is not used for grouped data.

Valid Entry: numeric value up to 999999

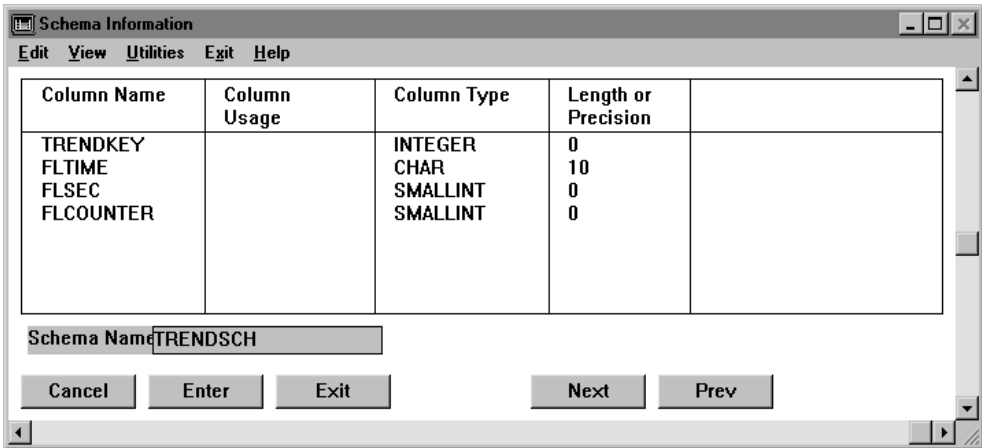
- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **SCHEMAS**
- *Schema Information Panel*
-
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SCHEMA INFORMATION PANEL

Perform the following steps to configure the Schema Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Database Schema Creation in the Configuration Manager Main Menu to display the Schema Information panel.



- 3 Specify the following information for this panel:

Column Name

Column name. Each name must be unique within a table structure and must conform to the standards for the relational database being used. Column names that begin with a number are not supported in FactoryLink. The column name for dBASE IV is limited to 10 characters. Refer to the user’s guide on the database you are using for specific naming conventions allowed.

Valid Entry: column name

Column Usage

Kind of information sent to the column. This can be one of the following:

data

(Defautl) Use for columns not used for sequence, time, or group.

sequence

Use for columns receiving a sequence number in integer form.

time Use for columns receiving a number in time-stamp form. The time-stamp used is the value from the global tag SECTIME.

group Use for columns receiving the group identification assigned to the row of data.

Refer to Chapter 20, “Database Logger” of the FactoryLink Configuration Guide for more information about column use and different ways of logging information.

Column Type Key word that represents the data type contained in the column. This can be either a data type FactoryLink supports or a data type the relational database receiving the data supports.

If you are using a data type specific to the relational database, refer to the relational database user’s guide for correct syntax.

If you are using a FactoryLink data type, supported types are small integer, integer, float, character, date, and number. Press Ctrl+K for the correct syntax for each data type. The one you use depends on how the column is used as defined in the Column Usage field of this panel. The following table lists the dependencies.

Column Usage	Column Type
data	All supported types.
sequence	Do not specify a column type.
time	Do not specify a column type.
group	All supported types.

Valid Entry: **key word name**

Valid Data Type: **small integer, integer, float, character (default), date, or number**

If you do not know the data type when filling out this panel, specify unknown as a place holder and a reminder that you need to go back and define it before completing the configuration.

If you do not change unknown to a supported type before starting the application, Logging and Historian generate an error.

- **SCHEMAS**
- *Schema Information Panel*
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Length or Precision Maximum number of characters the column can store if you defined a character data type in the Column Type field. This cannot exceed 64 if the Column Usage field is group. The data is truncated to the maximum size if you try to store more than the specified maximum (80 characters).

Length does not apply if you defined a data type other than character or number, so leave this field blank to assume the default 0 (zero). If you do not leave this field blank (or 0), an error occurs when you execute DBLOG at run time to create a database, and a database table is not created.

If the Column Type field is number or contains a data type the relational database supports, specify a precision qualifier, such as xxx or xxx,yyy, where x and y can be any number. The precision qualifier defines number of digits (including the decimal) the column allows, and the accuracy of the number before rounding occurs.

With the dBASE Historian, for a float data type, the maximum precision you can save is a five-digit integer with a precision of five (11,5). A float data type with a value greater than 99,999 is not logged correctly, and is displayed as eleven asterisks. To circumvent this constraint, dBASE users can specify number as the Column Type. This allows larger numbers; for example, by using a precision of (13,3), you can log the number 123456789.123.

Valid Entry: alphanumeric string up to 80 characters

If Column Type is . . .	Length/Precision is . . .
integer	0 (not applicable)
small integer	0 (not applicable)
float	0 (Maximum float precision in FactoryLink is (11,5), which is the default precision for data values in a float-type column. dBASE IV users: To log values with precision greater than (11,5), use the number data type. This allows larger numbers; for example, by using a precision of (13,3), you can log the number 123456789.123.
date	0 (not applicable)
character (length)	xxx where x can be any number. If Column Usage is group, the maximum length is 64.
number (precision)	precision qualifier xxx,yyy where x and y can be any number. xxx = total characters, including decimal point, in the value character string and yyy = number of characters at the right of the decimal.

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **SCHEMAS**
- *Index Information Panel*
-
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INDEX INFORMATION PANEL

Perform the following steps to configure the Index Information panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Database Schema Creation in the Configuration Manager Main Menu to display the Index Information panel.

The screenshot shows a window titled "Index Information" with a menu bar containing "Edit", "View", "Utilities", "Exit", and "Help". Below the menu bar is a table with four columns: "Index Nbr.", "Unique Index?", "Column List", and an empty column. The table is currently empty. Below the table is a "Schema Name" label followed by a text input field. At the bottom of the window are five buttons: "Cancel", "Enter", "Exit", "Next", and "Prev".

Index Nbr.	Unique Index?	Column List	
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Schema Name

- 3 Specify the following information for this panel:
 - Index Nbr. Number of between 1 and 99 to uniquely identify the index key you are defining for this schema. Start with 1 and increment by one for each line item. The more indices, the more disk usage and time it takes to log data.
Valid Entry: number of between 1 and 99

- Unique Index** Specifies whether or not this index key represents a unique index. The value you enter in this field must be uppercase. This can be one of the following:
- YES** Duplicate record values are not permitted in the column(s) comprising this index key. If an attempt is made to log a duplicate value, FactoryLink displays an error message and the column of data is not logged.
 - NO** Duplicate record values are permitted in the column(s) comprising this index key.
- Column List** Name of the column or columns in the table structure that comprise the index key. The name must match the name of a column defined in the Column Name field of the Schema Information panel.
- If you are using more than one column as part of the index key, specify the names of each column separated by a plus sign (+). If multiple columns are specified, they are indexed in the column order they are displayed in this field.
- If you are creating a table using the dBASE IV Historian, observe the following constraints:
1. The total number of characters keyed in should not exceed 254, as characters over that limit will not be recognized as valid columns.
 2. The width of the columns in bytes (which depends on column type; for example, a column of type char(4) has a width of 4 bytes) should be a number less than the maximum size (100 bytes) of the "key" field specified in the codebase 4.5 lib.
- 4 Click on Enter to save the information.
 - 5 Click on Exit to return to the Main Menu.

- **SCHEMAS**
- *Security Event Logging Schema Panel*
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SECURITY EVENT LOGGING SCHEMA PANEL

Perform the following steps to configure the Security Event Logging Schema panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Database Schema Creation in the Configuration Manager Main Menu to display the Security Event Logging Schema panel,

Column Alias	Column Name	Column Type	Length or Precision
TMSTAMP	TMSTAMP	DATE	16
OPERNAME	OPERNAME	CHAR	16
EVNTYPE	EVNTYPE	CHAR	16
EVNTMSG	EVNTMSG	CHAR	40

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:

Column Alias Alias assigned to the column in the security logging database. This column alias associates security event data with a column name and column data type in a database table. Information captured for the event is logged to this column in the database table. If an alias is not referenced in this column, the data is not captured.

The aliases define columns which contain the following data:

TMSTAMP Time of event (time-stamp)

OPERNAME Name of operator generating event

EVNTYPE Type of event

EVNTMSG Message generated by event

DATA User-defined information

If you wish to delete a column of information from a table, remove the column alias for that column and the information is not recorded.

Valid Entry: `tmstmp`, `opername`, `evntype`, `evntmsg`, `data`

Column Name Name displayed as the column heading for the column in the security event table. Defaults are `TMSTMP` for the time column, `OPERNAME` for the operator name column, `EVNTYPE` for the event type column and `EVNTMSG` for the event message column. You can change this to any title.

Valid Entry: any alphanumeric name of up to 32 characters

Column Type Type of information contained in the column. For the `TMSTMP`, the data is in time-and-date format. For other columns, the information is in character format.

Valid Entry: keyword name

Valid Data Type: `date`, `char`

Length or Precision Maximum number of characters the column can store if you defined a character data type in the Column Type field. The data is truncated to the maximum size (80 characters) if you try to store more than the specified maximum.

If you specified date as the Column Type, length does not apply, so leave this field blank to assume the default 0 (zero). If you do not leave this field blank (or 0), an error occurs when you execute `DBLOG` at run time to create a database, and a database table is not created.

Valid Entry: integer from 0 to 99,999 (default = 80 characters)

- 4 Click on Enter to save the information.
- 5 Click on Exit to return to the Main Menu.

- **SCHEMAS**
- *Data-Point Logging*
-
-

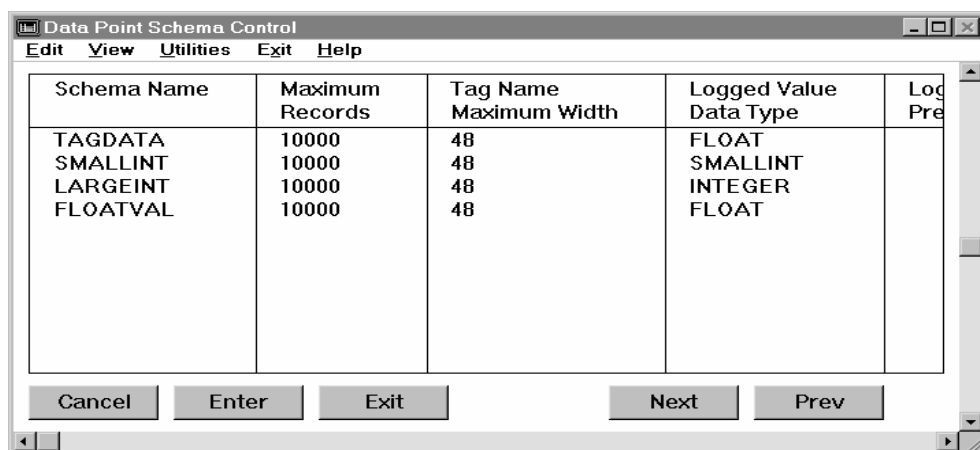
DATA-POINT LOGGING

You must create a new database schema record in the Data-Point Schema Control panel to reference a database schema not preconfigured in Data-Point Logging. See “Data-Point Schema Control Panel” on page 507 for more information on assigning schema names. Before you use a new schema in Data-Point Logging, however, you must reference it in the Data-Point Logging Control panel. See “Logged Value Precision” on page 508 for more information.

DATA-POINT SCHEMA CONTROL PANEL

Perform the following steps to configure the Data-Point Schema Control panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Data-Point Logging in the Configuration Manager Main Menu to display the Data-Point Schema Control panel.



- 3 Specify the following information for this panel:

Schema Name Unique alphanumeric character string of up to 19 characters of the schema that defines a unique data-point logging table structure. You must also reference this schema on the Data-Point Logging Control panel.

Valid Entry: unique alphanumeric character string of up to 19 characters

Maximum Records Maximum number of records allowed in a data-point logging table governed by this schema in the dBASE IV database.

Only dBASE IV databases use this field.

You can use this parameter to automate table maintenance; when the maximum is reached, the oldest record is deleted.

As many records as disk space allows are logged if you leave this field blank.

- **SCHEMAS**
- *Data-Point Schema Control Panel*
-
-

	Valid Entry: integer from 1 to 999999
Tag Name Maximum Width	Maximum width the data-point logging table column receiving the tag name may occupy. If the tag name contains domain and dimension specifications, you must include them when calculating the tag name width. Use this parameter for efficient data space utilization. For example, if the logged tag name will never exceed 8 characters, reduce the width to 8.
	Valid Entry: integer between 8 and 48 (default = 48)
Logged Value Data Type	Data types allowed for the tag being logged to the data-point logging table.
	Valid Entry: float, integer, smallint, or a user-specified database-dependent data type (such as NUMBER for Oracle)
Logged Value Precision	Precision qualifier in the form of <i>xxx</i> or <i>xxx,yyy</i> where x and y can be any number. This defines the number of digits of desired accuracy for the number before rounding.

DATA-POINT LOGGING CONTROL PANEL

Perform the following steps to configure the Data-Point Logging Control panel:

- 1 Ensure the domain selected is SHARED in the Configuration Manager Domain Selection box.
- 2 Choose Data-Point Logging in the Configuration Manager Main Menu to display the Data-Point Logger Control panel.

Table Name	Schema Name	Database Alias Name	Historian Mailbox	

Buttons: Cancel, Enter, Exit, Next, Prev

- 3 Specify the following information for this panel:

Table Name Unique alphanumeric name of 1 to 16 characters of the data-point logging table that receives the data.

If this table does not exist in the relational database, the Historian creates it using the schema defined in the Schema Name field when you make a corresponding entry in the Data-Point Schema Control panel.

Valid Entry: unique alphanumeric name of 1 to 16 characters

Schema Name Unique alphanumeric name of 1 to 19 characters of the table schema that defines the structure of the relational database tables receiving the data.

This entry must correspond with an entry in the Data-Point Schema Control panel. An error message is generated if no corresponding entry exists.

Valid Entry: unique alphanumeric string of 1 to 19 characters

- **SCHEMAS**
- *Data-Point Logging Control Panel*
-
-

Database Alias Name Name of up to 31 characters of the relational database Historian sends the data from Data-Point Logging to. This entry must match a database alias name entry on a database-specific Historian Information for... panel.

An invalid entry causes a fatal error and run-time termination.

Valid Entry: name of 1 to 31 characters

Historian Mailbox Name of the mailbox tag to be used by Data-Point Logging to transfer data to the Historian. This tag must match a mailbox tag entry on a database-specific Historian Information for... panel.

An invalid entry causes a fatal error and run-time termination.

Valid Entry: standard tag name

Valid Data Type: mailbox

4 Click on Enter to save the information.

5 Click on Exit to return to the Main Menu.

Trending

As data is collected or computed by FactoryLink, it is stored as a data element in a real-time database. Each time data is collected, or computed, the value stored in the real-time database for an element is overwritten by the new data.

Using the Trend application, you can create animated graphs called trend charts that graphically show this numeric data. To show the data as it occurs, you create real-time trend charts using the real-time database. To show the data after it occurred, you create historical trend charts using a relational database.

Trending Methodology

Trending is logically divided into two categories: historical and real-time. Historical trending allows you to chart data from the relational database, either historically or in real time. Real-time only trending allows you to chart data directly from the real-time database. As a new value is written to the database, the value will be displayed on the real-time trend chart. Data displayed on a real-time trend chart is not saved.

Real-time Only Trending

Real-time only trending allows you to chart data directly from the real-time database. As a new value is written to the database, the value will be displayed on the real-time trend chart. Data displayed on a real-time trend chart is not saved.

Chart Types

Within trending there are two types of charts: time-based and event. The chart type to use depends on how the data was indexed. This can be one of the following.

- **Timestamp**—if the data is indexed on a timestamp, you must trend the data on a time-based chart.
- **Integer**—if the data is indexed on an integer, you must trend the data on an event chart.
- **Integer plus a group ID**—if the data is indexed on an integer plus a group identifier, you must trend the data on an event chart.

- **TRENDING**
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Switching Between Real-time and Historical Mode

Switching modes allows you to switch between viewing real-time and historical data. When in real-time mode, a trend chart shows data as it is being logged to the database.

When in historical mode, a trend chart shows only data stored in the database. If you change screens while in historical mode, and then return to the trending screen, FactoryLink will reload the trend chart with the same historical data you were viewing before you changed screens.

Zooming and Panning

Because historical trend data is written to a relational database, it can be arranged to show different data ranges (pan) and these ranges expanded or collapsed (zoom). Using FactoryLink, you can zoom and pan to a particular sample or group in event charts, or time in time-based charts.

Pen Types

Using FactoryLink, you can create either fixed or variable pens. Fixed pens allow you to permanently assign a database column to a particular pen. Variable pens allow you to assign the column to a pen at run time. You can assign multiple pens to a trend chart. For readability, we recommend you configure no more than eight pens to a chart.

Value Cursor

A value cursor allows you to display the value associated with a point on a trend chart. At run time, when you click anywhere in the chart, the value cursor, which looks like a vertical bar, is displayed. The system displays the value for the point where the value cursor intersects the trend line.

Configuring Program Arguments

You can configure system configuration program arguments to affect Trend functions.

TREND DATABASE TABLES PANEL

Perform the following steps to configure the Trend Database Tables:

- 1 Ensure the domain selection is USER in the Configuration Manager Domain Selection box.
- 2 Choose Trend Database Tables in the Configuration Manager Main Menu to display the Trend Database Tables panel.

Database Alias Name	Database Table Name	Time Key	Sequence Key	Group Key	Historian Mailbox

Buttons: Cancel, Enter, Exit

- 3 Specify the following information for this panel:

Database Alias Name Database alias name that references the database storing the data you want to trend. This name must match the alias name assigned to the database in the Database Alias Name field on the Historian Information panel.

Valid Entry: database alias name

Database Table Name Database table name that references the table the Historian retrieves the data from. This name must match the table name assigned in the Database Table Name field on the Database Logging Control panel for the operation that logged the data if the data was logged using Database Logging.

Valid Entry: database table name

- **TRENDING**
- *Trend Database Tables Panel*
-
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Time Key Name of the column in the database table where the time the data is logged is recorded and indexed if you are defining a time-based trend chart. This name must match the name defined in the Column Name field on the Schema Information panel if you defined the table format through the schema table.

This time column must be a unique index.

Valid Entry: **column name**

Sequence Key Name of the column in the database table where the order the data was logged is recorded and indexed if you are defining an event trend chart.

This name must match the name defined in the Column Name field on the Schema Information panel whose column usage is sequence if you defined the table format through the schema table.

Valid Entry: **column name**

Group Key Name of the column in the database table where the group identification for the logged data is recorded if you are defining an event trend chart.

This name must match the name defined in the Column Name on the Schema Information panel if you defined the format through the schema table.

Valid Entry: **column name**

Historian Mailbox Name of the mailbox tag used to transfer the data from the relational database. After the tag is defined here, it should also be entered in the Historian Mailbox field on the Historian Mailbox Information panel.

The Historian Mailbox tag must be defined in the SHARED domain; otherwise, the Historian task will not recognize it as a valid mailbox and will not communicate with the Trending task.

Valid Entry: **standard tag name**

Valid Data Type: **mailbox**

4 Click on Enter to save the information.

5 Click on Exit to return to the Main Menu.

TRENDING MESSAGES

If Trending encounters any problems during run time, an error message is displayed on the Run-Time Manager screen next to the name of the Trending task on the SHARED domain window.

This section lists all messages that can occur during Trending run time, describes their possible causes, and provides corrective actions.

'%' key not found for table '%'

Cause: The required key for the type of chart created is not defined in the Trend Database Tables panel.

Action: Define the key. Also verify the key does exist.

Can't close file *file_name*

Cause: Either the operating system, third-party software, or hardware setup on your system is incorrect or incompatible, or an internal error occurred.

Action: Verify the following:

- 1.The operating system is set up to run FactoryLink (tuning parameters, resources).
- 2.All third-party software needed by FactoryLink, such as X-Windows, is installed and set up correctly and you have the correct version for FactoryLink.
- 3.All hardware is correctly set up and is compatible.

Contact Customer Support if everything is set up correctly and compatible and the error continues to occur.

Can't find SECTIME tag

Cause: Either the GLOBAL.CT file does not exist or is corrupt.

Action: Rebuild the GLOBAL.CT file by running `ctgen global`.

Couldn't build select for historical data

Cause: The Historian is down. The database is inactive. Either the operating system, third-party software, or hardware setup on your system is incorrect or incompatible, or an internal error occurred.

- **TRENDING**
- *Trending Messages*
-
-

Action: Verify the hardware, operating system, third-party software, FactoryLink version, and Historian are set up correctly and are running. Correct it if incorrect. Recreate the database if necessary. Contact Customer Support if everything is set up correctly and compatible and the error continues to occur.

Couldn't build select for real-time data

Cause: The Historian may be down. The database may be inactive. Either the operating system, third-party software, or hardware setup on your system is incorrect or incompatible, or an internal error has occurred.

Action: Verify the hardware, operating system, third-party software, FactoryLink version, and Historian are set up correctly and are running. If incorrect, correct it. If necessary, recreate the database. Contact Customer Support if everything is set up correctly and compatible and the error continues to occur.

Corrupt configuration table index

Cause: The system is unable to read a .CT file index.

Action: Delete the file and recreate it by restarting the application.

FactoryLink error (%/d)

Cause: An unknown PAK function error occurred within the TREND task.

Action: Contact Customer Support.

Failed to connect to database: '%s'

Cause: The TREND task failed to connect to the specified database.

Action: Verify the correct database alias was specified. The database alias needs to exist in the Historian panel.

Failed to connect to Historian

Cause: An invalid mailbox tag is specified.

Action: Verify the tag name in the Historian Mailbox field in the Trend Database Tables panel is a valid name and the tag type is mailbox. Delete the tag if incorrect and recreate it as defined in

the Historian Mailbox Information panel. Generate .LOG files for the Trend and Historian by placing a -v4 -14 in the program arguments in the System Configuration panel.

Failed to prepare SQL statement for historical data

Cause: Historian failed to prepare the SQL statement sent from TREND.

Action: Examine Historian error log file for further information describing why the prepare failed. Typically it is because of invalid table name or column name.

Failed to prepare SQL statement for real-time data

Cause: Historian failed to prepare the SQL statement sent from TREND.

Action: Examine Historian error log file for further information describing why the prepare failed. Typically it is because of invalid table name or column name.

Failed to prepare stmt id

Cause: A nonexistent table name or field name is specified or a syntax error is made in an SQL statement.

Action: Verify all pens and charts are defined correctly. Also verify information in TREND Database Tables panel is correct. Rerun the application with a -v4 -14 as program arguments for Trend and Historian tasks in the System Configuration panel.

Historian database error: '%s'

Cause: This message is accompanied by various other messages that describe the cause of the error.

Action: Respond to the message displayed on the Run-Time Manager panel or use the .LOG file by rerunning the application with -v4 -14 as program arguments for Trend and Historian tasks in the System Configuration panel.

Incorrect chart record

Cause: The chart record in the .CT file does not match the record specified.

- **TRENDING**
- *Trending Messages*
-
-

Action: Delete the old chart record. Enter the correct data and restart the application to rebuild the .CT.

Incorrect chart record size

Cause: The .CT file is corrupt or the .CTG file is incorrect.

Action: Run the application. Contact Customer Support if unsuccessful.

Incorrect column/tag name '%s' chart '%s' pen

Cause: Invalid information is written to the dynamic pen message tag.

Action: Verify the Database, Table, and Column/Tag names are all valid.

Incorrect configuration table type

Cause: The .CTG file is incorrect. Either the operating system, third-party software, or hardware setup on your system is incorrect or incompatible, or an internal error occurred.

Action: If the .CTG file is incorrect, get a new .CTG file and run ctgen trend to rebuild the .CT. Verify the hardware, operating system, third-party software, FactoryLink version, and Historian are set up correctly and are running. Correct it, if incorrect. Recreate the database if necessary. Contact Customer Support if everything is set up correctly and compatible and the error continues to occur.

Incorrect pen record

Cause: You entered invalid data in at least one of the Pen dialogs.

Action: Check all Pen dialog entries for proper entries and correct any errors.

Incorrect pen record size

Cause: Either the operating system, third-party software, or hardware setup on your system is incorrect or incompatible, or an internal error has occurred.

Action: Run ctgen trend.

Incorrect table record/Incorrect table record size

- Cause:** The .CTG file is incorrect. The operating system, third-party software, or hardware setup on your system is incorrect or incompatible or an internal error occurred.
- Action:** Get a new .CTG file if the .CTG file is incorrect and run ctgen trend to rebuild the .CT . Verify the hardware, operating system, third-party software, FactoryLink version, and Historian are set up correctly and are running. Correct setup, if incorrect. Recreate the database, if necessary. Contact Customer Support if everything is set up correctly and compatible and the error continues to occur.

Invalid stmt id returned from Historian

- Cause:** The Historian shut down.
- Action:** Shut down the Trend task and all other Historian tasks running. Restart the Historian and Trend tasks. Rerun the application with a -v4 -14 as program arguments for the Trend and Historian tasks in the System Configuration panel if this does not resolve the problem.

Invalid tag name '%s' in chart '%s' pen. Error '%s'

- Cause:** The tag specified in the Pen dialog is not a valid tag.
- Action:** Verify the tag exists in the SHARED domain and is not a msg or mbx tag.

Memory error alloc failed

- Cause:** The Trend task cannot acquire memory to run.
- Action:** Restart the task. Install more RAM if the task fails again.

No chart found

- Cause:** You deleted a chart but did not delete its associated pen(s).
- Action:** Delete the pen(s) associated with the deleted chart.

No mailbox tags defined

- Cause:** You did not enter TRENDMBX_U in the Scroll Tag field on the Chart Animation panel.

- **TRENDING**
- *Trending Messages*
-
-

Action: Enter TRENDMBX_U in the Scroll Tag field of the Chart Animation panel.

No table found

Cause: A valid database table name is not entered in the Table field of at least one Pen dialog.

Action: Enter a valid database table name in the Table field of the Pen dialog.

No tables configured for this task

Cause: A .CT file does not exist or cannot be found. The installation may not have completed successfully or the file may have been damaged.

Action: Run ctgen trend. Run the application. Contact Customer Support if this is not successful.

No triggers defined for this task

Cause: A .CT file may be corrupt.

Action: Run ctgen trend. Run the application. Contact Customer Support if this is not successful.

Out of RAM

Cause: Not enough memory is available.

Action: Close any unnecessary windows or programs. Add memory to the system if this occurs often.

Register for historical data failed/Register for real-time data failed

Cause: The Historian may be down. The database may be inactive. Either the operating system, third-party software, or hardware setup on your system is incorrect or incompatible, or an internal error occurred, or a database alias name, table name, or column name may have been entered incorrectly for one or more pens.

Action: Verify the hardware, operating system, third-party software, FactoryLink version, and Historian are set up correctly and are running. Correct setup if incorrect. Recreate the database if necessary. Check all Pen dialogs for correct entries. Add -L -V3 to the Historian program arguments in the System Configuration

table. Run the application and verify all parameters in the register SQL statement. Contact Customer Support if everything is compatible and set up correctly, but the error continues to occur.

Table ‘%s’ or Database ‘%s’ in Pen panel not found in Trend Table

- Cause:** The table or database specified in the Pen dialog is not specified in the Trend Database Tables AC file or else is not specified in the Data-Point Schema panel.
- Action:** Retype the table or database name specified in the Pen dialog if it is spelled incorrectly. Ensure the database is either in the Data-Point Schema panel or the Trend Database Tables panel.

Tried to access a nonexistent field

- Cause:** Tried to access a nonexistent field.
- Action:** Verify the field name as specified in the pen configuration and all field names specified in the Trend Database Tables panel. Verify the field has been created.

Tried to access a nonexistent table

- Cause:** Tried to open a nonexistent table.
- Action:** Verify the table name as specified in the pen configuration and in the Trend Database Tables panel. Verify the table has been created.

Unknown *function* request sent to Historian

- Cause:** The Trend task sent an invalid request to the Historian.
- Action:** Restart the Trend and Historian tasks.

Wrong # of CTs archived in file *file_name*

- Cause:** A .CTG file is corrupt.
- Action:** Contact Customer Support to obtain a new .CTG.

- **TRENDING**
- *Trending Messages*
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Window Management

Window Management allows you to set up default run-time parameters as well as determine which order configuration panels display in.

This chapter provides a field-by-field description of the Window Management panels:

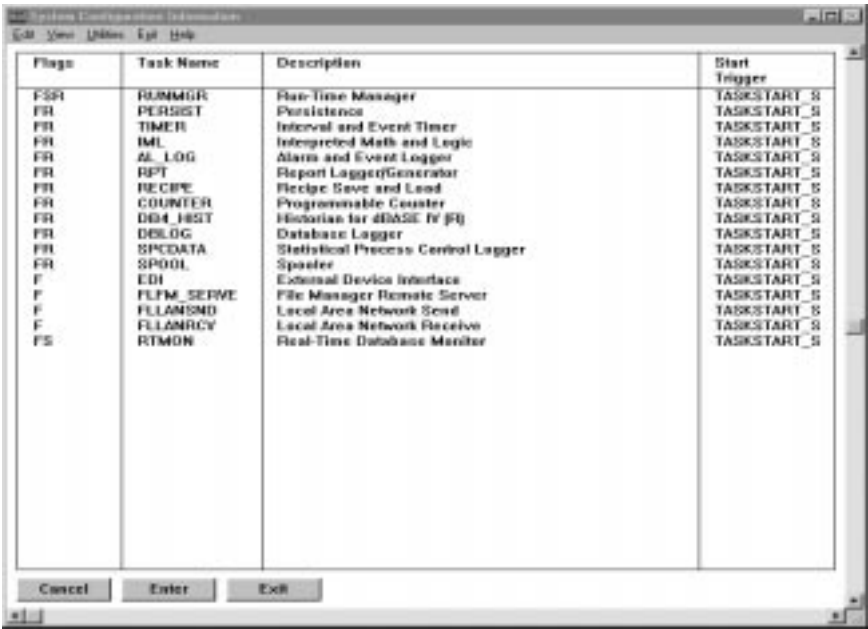
- System Configuration Information panel—Refer to the “System Configuration Information Panel” on page 524.
- Window Management Control panel—Refer to the “Window Management Control Panel” on page 531.

- **WINDOW MANAGEMENT**
- *System Configuration Information Panel*
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SYSTEM CONFIGURATION INFORMATION PANEL

Perform the following steps to configure the System Configuration Information panel:

- 1 Choose System Configuration in the Configuration Manager Main Menu to display the System Configuration Information panel.



- 2 Specify the following information for this panel:

- Flags

Process the system performs. A task can have multiple flags with flag values entered in any order. The entries and descriptions are as follows:
- S

Session flag - Provides the process with its own window. Any output to that process or task is directed to this window rather than to the Run-Time Manager window. The RUNMGR, RTMON, and APPEDIT processes require their own windows.

- R Run flag - Activates this task at FactoryLink startup. Do not enter the R flag to allow an operator to start a task manually.
- F Foreground flag - Puts this task in the foreground at startup. Use the F flag if the task has neither the S nor the R flags.

Task Name Alphanumeric string of 1 to 32 characters that defines the name of the process (task), such as RECIPE, ALOG, or TIMER. Do not modify these default names. Define a program name for an external program.

Valid Entry: alphanumeric string of b 1 to 32 characters

Description Alphanumeric string of 1 to 80 characters that defines the description of the task listed in the Task Name field. For example, the description of the SPOOL task is Print Spooler.

Valid Entry: alphanumeric string of 1 to 80 characters

The next six elements contain information about the task at run time. This information is displayed on the Run-Time Manager screen.

Start Trigger Name of an element that triggers (provides the mechanism for starting) the task. If the Flags field contains an R for this task, at run time a 1 (ON) is written to this element. This causes FactoryLink to start the task automatically. If the Flags field for this task does not contain an R, the task does not start until the operator writes a 1 (ON) to this element by clicking on the task name on the Run-Time Manager screen.

The data type for this tag can be digital or analog, depending on the kind of data stored in the tag.

Valid Entry: standard tag name (default = digital)

Valid Data Type: digital, analog

Task Status Name of an element that contains the analog status of the task. This element can have the following analog values:

- 0 Inactive
- 1 Active
- 2 Error
- 3 Starting
- 4 Stopping

- **WINDOW MANAGEMENT**
- *System Configuration Information Panel*
-
-

Valid Entry: **standard tag name**

Valid Data Type: **analog**

Task Message Name of an element the task listed in the Task Name field writes any run-time messages to. These messages are displayed in the Message column of the Run-Time Manager screen.

This element can have the following message values:

Inactive

Active

Error

Starting

Stopping

Valid Entry: **standard tag name**

Valid Data Type: **message**

Display Status Name of an element that contains a text version of the status of the process. The task status is displayed in the Status column on the Run-Time Manager screen.

Valid Entry: **standard tag name**

Valid Data Type: **message**

Display Name Name of an element that contains the string entered in the Task Name field. This task name is displayed in the Task column on the Run-Time Manager screen.

Valid Entry: **standard tag name**

Valid Data Type: **message**

Display Description Name of an element that contains the string entered in the Description field on this panel.

Valid Entry: **standard tag name**

Valid Data Type: **message**

Start Order Numeric value between 0 and 31 to define the order tasks are started in at run time. The task defined with Start Order 0 starts first. Start Order 1 starts next, and so on, until Start Order 31, which starts last. Tasks with the same start order number start consecutively. The default Start Order for the Run-Time Manager task is 0. Use the following guidelines to determine the Start Order for certain tasks.

Set the Start Order for:	To start:
Historian	Before Logger.
Logger	Before Trending.
Math & Logic	Coordinated with the functions defined in the procedures. For example, if a procedure is dependent on data from an external device, start EDI before Math & Logic.

Priority Processing priority for the task. The priority is a three-digit hexadecimal value which is divided into two parts:

Caution: We recommend you leave the priority at the default value unless you are knowledgeable and experienced in setting priorities in the operating system.

First part (the 2 in 201): Hex value that specifies the operating system class of priority, as listed below. This part is inactive in Windows.

- 0 Current class unchanged
- 1 Idle
- 2 (default) Regular
- 3 Time-critical

Do not set any Reference Guide task to priority class 0 or 1. Use caution in assigning a task with priority class 3 because a time-critical task takes priority over a foreground task. A foreground task takes priority over regular tasks at run time.

Second part (the 01 in 201): Two-digit hexadecimal value (00 to 1F [0 - 31 decimal]) that specifies the priority within the priority class listed above. The higher the number, the higher the priority within the class.

Hexadecimal value 00 to 1F (default = 01)

Refer to the appropriate operating system guide for further information about processing priority within an operating system.

- **WINDOW MANAGEMENT**
- *System Configuration Information Panel*
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Executable File

Location of the executable file. Do not use leading spaces if this is a relative path name to FLINK.

Any path name that has the following format:

\DIRECTORY\SUBDIRECTORY\FILENAME

For example, bin\iml

Do not use a file extension of .exe for this entry. It is not required and can cause undesirable results if the application is ported to UNIX.

Application Directory

Reserved for future use.

Program Directory

Reserved for future use.

Program Arguments

Values used as the arguments to the process. No arguments are passed to the task if this field is blank. Program arguments are not case-sensitive. The table below shows valid arguments for applicable tasks.

FactoryLink Task	Valid Entries	Descriptions
Data Alarm Logger	-A -F -T	Disables the printing of return-to-normal alarms. Freezes initial text display of alarms configured with %s (C-style) variables. Enables the limit value to be written to the limit tag. If the -T option is not specified, the limit value is not initialized upon Data Alarm Logger startup.

FactoryLink Task	Valid Entries	Descriptions
Batch Recipe	-L -L -V#	Log error messages to a file. Log error messages with more information (increased verbose level) to a file.
Database Browser		
Historians		
Math & Logic (Interpreted mode only)		
SPC Log, SPC View, and SPR		
Trending		
Database Logger	-L -L -V# -Q+	Log error messages to a file. Log error messages with more information (increased verbose level) to a file. Increase the size of the Logger's buffer.
Run-Time Graphics	-b<n> -o1 (letter o) -T -P	Used to set the rate of the fast blink option for animated objects. The default is 1000 mS. The rate <n> represents the number of milliseconds an object is shown and hidden. For example, if n equals 250, then the blink rate is 1/4 second, and the object will flash for 1/4 second, then off for 1/4 second. Performs redraw for static objects. Uses object's animated value. Performs redraw of symbol background.
Print Spooler	-M	Send print requests (except for alarm logs and binary files) to the system print queue instead of directly to the printer.

- **WINDOW MANAGEMENT**
- *System Configuration Information Panel*
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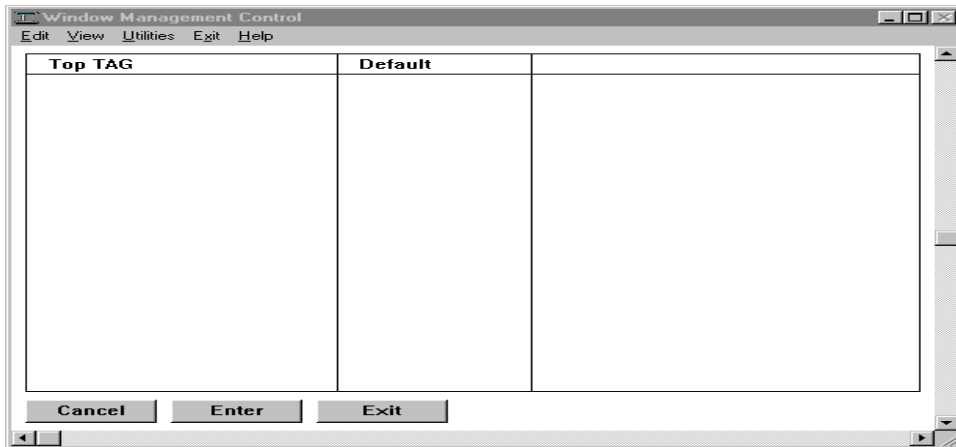
FactoryLink Task	Valid Entries	Descriptions
FactoryLink Local Area Networking (FLLAN)	-L	Log FactoryLink FLLAN error messages to a file.
	-L -D*	Log FactoryLink FLLAN error messages with more information (increased verbose level) to a file.
	-X	Log underlying network software's error messages to a log file.
	-R	Prevents FactoryLink from automatically setting FLLAN's Enable/Disable tag to 1 (ON).
File Manager	-L	Log error messages to a file.
	-L -D*	Log error messages with more information (increased verbose level) to a file.

- 3 Click on Enter to save the information.
- 4 Click on Exit to return to the Main Menu.

WINDOW MANAGEMENT CONTROL PANEL

Perform the following steps to configure the Window Management Control panel:

- 1 Choose Window Management in the Configuration Manager Main Menu to display the Window Management Control panel.



- 2 Specify the following information for this panel:

Top TAG Name of the element used to determine the top window.

Valid Entry: standard tag name
(default = TOPWINDOW_U)

Valid Data Type: message

Default Alphanumeric string of 1 to 8 characters to define the name of the default top window. This name must also be defined in the Application Editor window configuration. New applications created with FLNEW use the default values.

Valid Entry: alphanumeric string of 1 to 8 characters.
(default = FL_MAIN)

- 3 Click on Enter to save the information.
- 4 Click on Exit to return to the Main Menu.

- **WINDOW MANAGEMENT**
- *Window Management Control Panel*
-
-

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